CCGS W.E. RICKER, Assemblage Trawl Survey of Hecate Strait, June 5 – 17, 1998

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ABSTRACT

Choromanski E.M., J. Fargo, and A.R. Kronlund, 2002. CCGS W.E. Ricker, Assemblage trawl survey of Hecate Strait, June 5 - 17, 1998. Can. Data Rep. Fish. Aquat. Sci. 1093: 88 p.

The CCGS W.E. RICKER conducted a trawl survey of groundfish species in Hecate Strait during the period June 5 –17, 1998. A series of surveys have been conducted in this region beginning in 1984. This trip was a continuation of previous surveys conducted in May – June 1984, February 1986, May - June 1987, 1989, June 1991 and May - June 1993, 1995, and 1996. A total of 88 bottom trawl tows were completed using a Yankee 36 net. The total catch for the survey was 54,452 kg and was comprised of 56 fish species. Flatfish accounted for 52 % of the total catch, selachii 29 %, roundfish 17 %, rockfish 1%, and invertebrates 1 %. Length frequency data were collected from 4,993 English sole (*Parophrys ventulus*), 4,865 arrowtooth flounder (*Atheresthes stomias*), 4,372 rock sole (*Lepidopsetta bilineata*), 3,084 rex sole, 2,414 Dover sole (*Microstomus pacificus*), 1,215 Pacific cod (*Gadus macrocephalus*), 565 flathead sole (*Hippoglossoides elassodon*) and 364 Pacific halibut (*Hippoglossus stenolepis*). Otoliths were collected from 229 Dover sole, 312 English sole, and 225 rock sole, 75 petrale sole, 50 arrowtooth flounder, and 50 rex sole. A total of 108 otholiths were collected from quillback (85), yelloweye (10) and copper rockfish (13). In addition, 102 CTDs were collected during the survey. This report summarises the bridge log, catch, biological and oceanographic data collected.

RÉSUMÉ

Choromanski E.M., J. Fargo, and A.R. Kronlund, 2002. CCGS W.E. Ricker, Assemblage trawl survey of Hecate Strait, June 5 - 17, 1998. Can. Data Rep. Fish. Aquat. Sci. 1093: 88 p.

Le NGCC W.E. RICKER a effectué une étude par chalutage des espèces de poissons de fond dans le détroit d'Hecate Strait au cours de la période comprise entre le 5 et le 17 juin 2998. Une série d'études ont été effectuées dans cette région depuis 1984. Cette campagne était la continuation d'étues précédentes effectuées au cours des périodes comprises entre mai et juin 1984, février 1986, mai et juin 1987, 1989, juin 1991 et mai-juin 1993, 1995 et 1996. Au total, 88 traits de chalut ont été effectués avec un chalut Yankee 36. La quantité totale capturée a été de 54 452 kg et comptait 56 espèces de poissons, les poissons plats constituant 52 % du total, les selachii 29 %, les poissons ronds 17 %, les sébastes 1 %, et les invertébrés 1 %. Des données sur la taille des poissons capturés ont été recueillies sur 4 993 carlottins anglais (*Parophrys ventulus*), 4 865 plies à grande bouche (*Atheresthes stomias*), 4 372 fausses limandes (*Lepidopsetta bilineata*), 3 084 plies royales, 2 414 soles à petite bouche (*Microstomus pacificus*), 1 215 morues du Pacifique (*Gadus macrocephalus*), 565 plies à tête plate (*Hippoglossoides elassodon*) et 364 flétans du Pacifique (*Hippoglossus stenolepis*). Des échantillons d'otolites ont été prélevés sur 229 soles à petite bouche, 312 carlottins anglais et 225 fausses limandes, 75 plies de Californie, 50 plies à grande bouche et 50 plies royales. Au total, 108 otolites ont été prélevés sur des sébastes brèmes d'Amérique (85), des sébastes aux yeux jaunes (10) et des sébastes cuivrés (13). De plus, 102 CTD ont été recueillis durant l'étude. Ce rapport fait la synthèse des données du journal de bord, des données de capture et des données biologiques et océanographiques recueillies.

INTRODUCTION

A multispecies bottom trawl survey in Hecate Strait was initiated in the summer of 1984. The 1998 survey is the ninth in a series. Previous surveys were conducted in 1986, 1987, 1989, 1991, 1993, 1995, and 1996 (Fargo et al. 1984, 1986, 1988; Westrheim et al. 1984; Antonsen et al. 1990; Wilson et al. 1991; Hand et al. 1994; Workman et al. 1996, 1997). This survey provides comprehensive information for stock assessment work at the Pacific Biological Station. Data on length, weight, stage of maturation and otoliths for age determination are essential to support the management of the trawl fishery in this region. In addition, oceanographic data and information on invertebrates are an important component of ecological studies in this region.

METHODS AND MATERIALS

SURVEY DESIGN

The trawl survey was stratified by area and depth but the allocation of stations within depth strata was non-random. The fishing captain was allowed to locate trawlable bottom before setting the net. The sampling grid consisted of 10 nm^2 blocks encompassing Lat. 52°30' N and Lon. 130°5' W to Lat. 54°30' N and Lon. 131°45' W (Figure 1). The blocks were used to provide adequate spatial distribution of tows. Blocks were labelled A to L from north to south, and 1 to 6 west to east. The survey covers a depth range of 10 to 80 fathoms (18.3 to 146.3 meters). Each 10-fathom depth stratum within a block constituted a potential sampling site. The placement and direction of the tow was left to the discretion of the Fishing Master.

RESEARCH VESSEL AND GEAR

CCGS W.E. RICKER, a 57.3-m stern trawler was used for the survey. Bottom trawl tows were made with a Yankee 36 net (Fig. 2). Polyvalent steel trawl doors (1200 kg USA Jet, Model P) provided a horizontal opening of 10 - 12 m and a vertical opening of 2.5 – 3.5 m. The Yankee 36 bottom trawl net had 9.0 cm mesh in the wing 9.0 cm in the body 7.0 cm in the intermediate and 2.5 cm in the codend. The headline was 18.3 m long and hung with 40 20-cm diameter plastic floats. The net was connected to the trawl doors by a 36.6-m bridle/sweeplines.

CATCH PROCESSING

Species sorting was done in the vessel wet lab using plastic baskets of approximately 50-kg capacity. The tubs were weighed using a Marel Model 1100 metal platform balance. The total weight for each species in the tow was obtained by combining the weights of the tubs with the same species in the catch. Fish for length frequency samples and biological sampling were selected at random. Large catches were sub-sampled (Westrheim 1967) in order to reduce catch-processing time.

BIOLOGICAL DATA

Each sampled specimen was measured for length in millimetres and weighed in kilograms using a Marel Model 2200 electronic top loading balance with 6 kg capacity. The data were fitted to the power model of weight as a function of length.

$$W = a\ L^{b}$$

where W is weight, L is length and a and b parameters that are estimated.
The body cavity was exposed to determine the sex and the level of maturation (Appendix 1). Otoliths were extracted, cleaned and stored in a 50:50 solution of glycerine/water with 1 g thymol added per litre (MacLellan 1999). In addition, genetics data were collected for 10 rock sole from tow 50.

OCEANOGRAPHIC DATA

After the net was retrieved for each tow, a CTD cast was made using a SeaBird, Model SBE 911 +, serial # 0506. The CTD probe was lowered to within 10 m of bottom and measurements of temperature and conductivity were recorded at 0.1 m intervals during the descent. After the last tow of the day, a water sample was taken at the surface and at the bottom depth to determine salinity and conductivity. A total of 26 water samples were taken. Raw CTD data and water samples were analysed by staff at the Institute of Ocean Science. The IOSSHELL acquisition, processing and analysis programs were used for processing and plotting data. The IOSSHELL routine was used to convert SEA-BIRD 911+ data. The data are archived at the Institute of Ocean Sciences in Sydney, B.C. with reference number 9816.

RESULTS

FISHING OPERATIONS

A total of 88 bottom trawls were completed during the cruise, of which 86 were usable. Tows 18 and 20 were unusable due to codend damage. The summary of trawl stations occupied during the survey, block depth, total catch and effort are presented in Table 1 and Figure 1. Station H304 was sampled twice. Tows 77, 78 and 82 were sub-sampled (Westrheim 1967) due to large catches.

CATCH DATA

The total catch was 54,452.4 kg comprising 56 fish species (Table 2). Length measurements were taken from 62,249 specimens. The total catch for all species and the frequency of their occurrence are presented in Table 2. Principle species by weight were arrowtooth flounder 20 %, spotted ratfish 15 %, spiny dogfish 13 %, English sole 9 %, Dover sole 7 %, and rex sole 6 %. Flatfish comprised 52 % of the total catch by weight. Length frequency data were collected from 4,993 English sole, 4,865 arrowtooth flounder, 4,372 rock sole, 3,084 rex sole, 2,414 Dover sole, 1215 Pacific cod, 565 flathead sole, and 364 Pacific halibut (Table 5). Bridge log and species catch compositions are presented in Appendix 2.

BIOLOGICAL DATA

Samples Collected

Summary of biological samples collected, total weight, number and weight of fish sampled for otoliths are presented in Table 3. Otoliths were collected from 225 rock sole, 75 petrale sole, 312 English sole, 50 arrowtooth flounder, 50 flathead sole, 229 Dover sole, 50 rex sole, 13 copper rockfish, 10 yelloweye rockfish, and 85 quillback rockfish (Table 4).

Length Frequencies

Summary statistics (sexes combined) for length composition data by species are presented in Table 5. Length frequency histograms, for English sole, arrowtooth flounder, rock sole, rex sole, Dover sole, Pacific cod, flathead sole, and Pacific halibut were displayed in Figures. 3 to 10.

English sole sample size was 4,993 fish for both sexes. A strong mode was present at approximately 18 cm.

The size distribution for arrowtooth flounder is shown in Figure 4. There were 4,865 measurements taken for this species, ranged in size from 8 cm to 78 cm. A strong mode was present at 55 cm.

Rock sole ranged in size from 8 cm to 50 cm (Figure 5). A total of 4,372 rock sole were measured. A strong mode was present at 17-18 cm indicating 1996 year-class.

The histogram for Rex sole is presented in Figure 6. A total of 3,084 rex sole were sampled.

The size distribution for Dover sole is displayed in Figure 7. 2,414 specimens were measured. The mode occurred at 30 cm.

Total of 1,214 Pacific cod was sampled and the size distribution summary is presented in Figure 8. These fish range in size from 20 to 87 cm. Modes occurred at 20 to 33 cm and indicated an increase in the numbers of new recruits to the population.

The size composition of flathead sole containing 565 measurements is presented in Figure 9. Modes 24 cm and 37 cm were prominent for this species.

Total of 3,64 halibut were measured. The size distribution is presented in Figure10.

Length – Weight

A summary statistic for length and weight data by species is presented in Table 6. Regression statistics, correlation coefficient and, slopes and intercepts of regression lines are given in the figure legends.

The fitted length-weight relationship is presented by sex for English sole in Figure 11. Females dominated the sample. Male lengths ranged from 230 – 400 mm and weights ranged from 100 – 600 g. The female lengths ranged from 250 – 470 mm with weights from 100 - 470 g.

The regression for Dover sole is presented in Figure 12. Females weighed significantly more than males of the same length after fish reached a size of about 450 mm.

Rex soles males weighed less than females over the entire range of lengths (Figure 13). Male lengths were between 200 – 300 mm and weights ranged from 40 – 160 g.

Rock sole females were dominant in the sample and weighed more than males of the same length (Figure 14). Males were not present above 400 mm length and 800 g weight. Males lengths were between 120 - 400 mm and the weight from 20 - 800 g. Rock sole female lengths were from 80 - 480 mm and weights ranged from 20 – 1600 g (Figure 14). Females were dominant in the petrale sole sample. However, the low number of males in the sample did not provide a significant relationship (Figure 15).

Maturity

Summaries of the stage of maturity for species sampled are presented in Table 7 and flatfish maturity stages are defined in the Appendix 1.

For rock sole males, 14 % were immature and 16 % were resting (Figure 16). Females showed a similar pattern, where 29 % of 146 specimens were immature and 25 % were in a resting stage. The higher proportion of immature fish is correlated with a great number of small fish (<25cm) in the length frequency samples from these areas. No males and 8.5 % of females were at the developing stage. Only 2.2 % of the males and no females were spent.

More English sole males (8.7 %) than females 0 % were in the spawning stage (Figure 17, Table 7). Also, 23.7 % of the males were spent compared to 0.6 % of females. The resting stage was dominated by females, which comprised 16.7 % compared to 2.9% of males.

Most rex sole were in the spent or resting stages (Figure 18). The spent stage was dominated by females (22 %), compared to 8 % of males, the opposite of the resting stage, with 28 % males and 20 % females.

The sex ratio for petrale sole favoured females (Table 7). Over one third of the female petrale sole sampled were at the resting stage compared to 16 % of the males (Figure 19). Immature fish accounted for 12 % of the males and 26.7 % of the females.

For Dover sole, a similar proportion of males and females were resting, while 14 % of the males were spent compared to 6 % of the females (Figure 20). 25 % of the females were immature compare to 0.5 % of males.

OCEANOGRAPHIC DATA

During the survey a total of 102 CTD casts were completed. Temperature and salinity profiles for each cast are presented in Appendix 3.

ACKNOWLEDGEMENTS

We would like to acknowledge the assistance of the crew of the CCGS W.E. RICKER. We thank the Pacific Biological Station ageing laboratory for ageing the otolith samples. Brian Krishka reviewed the draft of the report and provided thoughtful comments.

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Table 1. Summary of trawl stations, block depth, total catch and effort.

Haul Number	Block Depth	Total Catch (kg)	Effort (h)	Haul Number	Block Depth	Total Catch (kg)	Effort (h)
1	L406	271.4	0.5	48	E407	478.3	0.5
2	K406	172.5	0.5	49	E405	735.3	0.5
3	K405	62.0	0.5	50	E403	209.2	0.5
4	K404	139.8	0.5	51	E402	349.5	0.5
5	K403	78.6	0.5	52	E406	477.4	0.5
6	K506	98.4	0.5	53	E404	711.3	0.433
7	J505	31.4	0.5	54	E302	236.0	0.5
8	J504	610.0	0.5	55	E202	209.2	0.5
9	J403	84.3	0.5	56	D302	126.5	0.5
10	J402	88.4	0.5	57	D303	524.9	0.5
11	J203	696.7	0.5	58	D304	465.3	0.5
12	J201	45.4	0.25	59	C304	995.5	0.5
13	J301	118.4	0.5	60	C305	1719.2	0.5
14	I401	116.3	0.5	61	C301	319.3	0.5
15	I403	176.3	0.167	62	C303	1258.6	0.5
16	J404	570.5	0.5	63	C201	93.2	0.5
17	I405	107.6	0.417	64	B301	374.4	0.5
18	I406	unusable		65	B302	185.2	0.5
19	I507	358.1	0.5	66	B305	766.4	0.5
20	I201	unusable		67	B304	447.1	0.333
21	I302	86.7	0.5	68	B303	232.3	0.333
22	I301	139.6	0.5	69	A304	269.2	0.333
23	I303	145.5	0.5	70	A306	620.2	0.5
24	H302	333.7	0.5	71	A307	247.0	0.5
25	H301	305.7	0.5	72	A207	858.4	0.5
26	H303	8.4	0.5	73	A206	811.3	0.5
27	H304	7.1	0.35	74	A205	1255.0	0.5
28	H304	208.3	0.5	75	A204	1068.1	0.5
29	H305	881.3	0.5	76	B202	398.0	0.5
30	H407	323.2	0.283	77	B104	4500.2	0.5
31	H406	100.6	0.5	78	B105	3000.1	0.5
32	G406	406.2	0.5	79	B101	3000.2	0.5
33	G405	491.1	0.5	80	B106	352.3	0.5
34	G305	1230.1	0.5	81	B103	182.2	0.5
35	G304	289.1	1	82	B204	4250.2	0.3
36	G302	88.2	0.5	83	B203	209.3	0.266
37	G301	1482.1	0.5	84	A203	116.2	0.5
38	G201	1612.2	0.5	85	B201	93.3	0.5
39	H201	908	0.5	86	B206	4500.0	0.5
40	F201	68.8	0.5	87	B205	3500.2	0.5
41	F302	123.4	0.5	88	B207	481.2	0.5
42	F303	272.4	0.5				
43	F405	8.5	0.5				
44	F406	182.2	0.5				
45	F404	113.4	0.5				
46	F407	106.3	0.5				
47	F403	77.5	0.5				
48	E407	478.3	0.5				

Table 2. Catch by species and frequency of occurrence of species captured during the Hecate Strait survey on the CCGS W.E. Ricker, June 5 - 17, 1998.

No.	Species Common name	Code	Scientific name	Total catch (kg)	% Total catch by weight	Number of Tows	% Frequency occurrence
	Flatfish						
1	Arrowtooth flounder	602	*Atheresthes stomias*	11,058.5	20.3	56	63.6
2	English sole	628	*Pleuronectes vetulus*	4,601.9	8.5	77	87.5
3	Dover sole	626	*Microstomus pacificus*	3,752.0	6.9	51	58.0
4	Rex sole	610	*Errex zachirus*	3,287.5	6.0	52	59.1
5	Pacific halibut	614	*Hippoglossus stenolepis*	2,314.1	4.2	57	64.8
6	Rock sole	621	*Lepidopsetta bilineata*	1,391.1	2.6	43	48.9
7	Pacific sanddab	596	*Citharichthys sordidus*	1,159.5	2.1	35	39.8
8	Flathead sole	612	*Hippoglossoides elassodon*	367.0	0.7	31	35.2
9	Butter sole	619	*Isopsetta isolepis*	134.0	0.2	21	23.9
10	Sand sole	636	*Psettichtys melanostictus*	77.2	0.1	20	22.7
11	Petrale sole	607	*Eopsetta jordani*	76.8	0.1	22	25.0
12	Slender sole	625	*Eopsetta exilis*	56.9	0.1	17	19.3
13	Starry flounder	631	*Platichthys stellatus*	31.0	0.1	4	4.5
14	Curlfin sole	635	*Plueronichthys decurrens*	13.3	Trace	11	12.5
16	Speckled sanddab	598	*Citharichthys stigmaeus*	4.0	Trace	13	14.8
17	C-O sole	633	*Pleuronichthys coenosus*	0.1	Trace	1	1.1
	Total Flatfish			28,324.9	52.0		
	Roundfish						
1	Pacific cod	222	*Gadus macrocephalus*	3,638.5	6.7	58	65.9
2	Walleye pollock	228	*Theragra chalcogramma*	3,240.4	6.0	52	59.1
3	Sablefish	455	*Anoplopoma fimbria*	892.7	1.6	45	51.1
4	Pacific herring	096	*Clupea pallasi*	489.0	0.9	50	56.8
5	Lingcod	467	*Ophiodon elongatus*	366.2	0.7	28	31.8
6	Pacific sand lance	361	*Ammodytes hexapterus*	321.7	0.6	28	31.8
7	Pacific tomcod	226	*Microgadus proximus*	298.1	0.5	27	30.7
8	Eulachon	148	*Thaleichthys pacificus*	89.8	0.2	13	14.8
9	Pacific sardine	100	*Sardinops sagax*	18.2	Trace	3	3.4
10	Salmon	124	*Oncorhynchus spp. (Family)*	18.0	Trace	3	3.4
11	Wolfeel	351	*Anarrhichthys ocellatus*	10.0	Trace	2	2.3
12	Red irish lord	502	*Hemilepidotus hemilepidotus*	4.1	Trace	2	2.3
13	Poachers	546	*Agonidae spp.(Family)*	3.0	Trace	21	23.9
14	Greenlings	459	*Hexagrammidae spp.(Family)*	2.1	Trace	2	2.3
15	Eelpouts	231	*Zoarcidae spp.(Family)*	1.9	Trace	10	11.4
16	Skipjack tuna	371	*Euthynnus pelamis*	1.9	Trace	10	11.4
17	Sculpins	472	*Cottidae spp. (Family)*	1.3	Trace	13	14.8
18	Pacific hake	225	*Merluccius productus*	1.2	Trace	3	3.4
19	Kelp greenling	461	*Hexagrammos decagrammus*	1.0	Trace	1	1.1
20	Shiner perch	304	*Cymatogaster aggregata*	0.1	Trace	1	1.1
	Total Roundfish			9,399.2	17.3		

No.	Species Common name	Code	Scientific name	Total catch (kg)	% Total catch by weight	Number of Tows	% Frequency occurrence
	Rockfish						
1	Yellowtail rockfish	418	*Sebastes flavidus*	329.1	0.6	11	12.5
2	Quillback rockfish	424	*Sebastse maliger*	77.1	0.1	9	10.2
3	Pacific ocean perch	396	*Sebastes alutus*	69.2	0.1	7	8.0
4	Silvergray rockfish	405	*Sebastes brevispinis*	58.0	0.1	7	8.0
5	Black rockfish	426	*Sebastes melanops*	55.0	0.1	2	2.3
6	Canary rockfish	437	*Sebastes pinniger*	28.0	0.1	3	3.4
7	Yelloweye rockfish	442	*Sebastes ruberrimus*	25.0	Trace	4	4.5
8	Bocaccio	435	*Sebastes paucispinus*	22.0	Trace	4	4.5
9	Copper rockfish	407	*Sebastes carinus*	8.1	Trace	3	3.4
10	Redstripe rockfish	439	*Sebastes proriger*	2.0	Trace	1	1.1
11	Greenstriped rockfish	414	*Sebastes elongatus*	2.0	Trace	1	1.1
12	Pygmy rockfish	448	*Sebastes wilsoni*	1.4	Trace	5	5.7
13	Darkblotched rockfish	410	*Sebastes crameri*	1.0	Trace	1	1.1
14	Harlequin rockfish	446	*Sebastes variegatus*	0.1	Trace	1	1.1
	Total Rockfish			678.0	1.2		
	Selachii						
1	Spotted ratfish	066	*Hydrolagus colliei*	7,930.5	14.6	66	75.0
2	Spiny dogfish	044	*Squalus acanthias*	6,953.1	12.8	69	78.4
3	Big skate	056	*Raja binoculata*	795.0	1.5	28	31.8
4	Longnose skate	059	*Raja rhina*	26.0	Trace	5	5.7
5	Sandpaper skate	058	*Bathyraja interrupta*	21.0	Trace	2	2.3
	Total Selachii			15,725.6	28.9		
	Total Fish			54,127.7	99.4		
	Invertebrates	0A0		324.7	0.6	48	54.5
	TOTAL CATCH			**54,452.4**	100.0		

Teble 3. Summary of biological samples collected and total weight and numbers of fish sampled for otoliths.

Species	Species Code	Weight caught (kg)	Number sampled	Weight sampled (kg)	Otoliths taken
Arrowtooth flounder	602	11,058.5	4,865	63.0	50
English sole	628	4,601.9	5,305	126.1	312
Dover sole	626	3,752.0	2,643	121.9	229
Rex sole	610	3,287.5	3,134	7.3	50
Rock sole	621	1,391.1	4,639	105.3	225
Flathead sole	612	367.0	615	159.8	50
Petrale sole	607	76.8	75	45.5	75
Yellowtail rockfish	442	329.1	10	22.7	10
Quillback rockfish	424	77.1	85	74.4	85
Copper rockfish	407	8.1	13	7.7	13
Total		**24,949.1**	**21,384**	**733.7**	**1,099**

Table 4. Summary of otolith samples.

DATE	TOW	SPECIES	CODE	FISH NO.	TRAY NO.	TOTAL FISH
06-Jun-98	9	Rock sole	621	3801-3847	6	47
07-Jun-98	11	Rock sole	621	3848-3897	7	50
08-Jun-98	22	Rock sole	621	3898-3982	8	93
11-Jun-98	50	Rock sole	621	3991-4000	12	10
11-Jun-98	50	Rock sole	621	4001-4003	13	3
11-Jun-98	51	Rock sole	621	4004-4009	13	6
11-Jun-98	55	Rock sole	621	4010	13	1
11-Jun-98	49	Rock sole	621	4011-4012	13	2
11-Jun-98	57	Rock sole	621	4013	13	1
11-Jun-98	58	Rock sole	621	4014-4025	13	12
						225
06-Jun-98	1	Petrale sole	607	301-309	2	9
06-Jun-98	2	Petrale sole	607	310-313	2	4
06-Jun-98	3	Petrale sole	607	314-315	2	2
06-Jun-98	4	Petrale sole	607	316	2	1
06-Jun-98	7	Petrale sole	607	317-318	2	2
06-Jun-98	28	Petrale sole	607	319-322	2	4
06-Jun-98	29	Petrale sole	607	323-332	2	10
08-Jun-98	31	Petrale sole	607	333	2	1
08-Jun-98	33	Petrale sole	607	334-335	2	2
08-Jun-98	34	Petrale sole	607	336-342	2	7
08-Jun-98	50	Petrale sole	607	343	2	1
08-Jun-98	57	Petrale sole	607	344-345	2	2
13-Jun-98	62	Petrale sole	607	346-350	2	5
14-Jun-98	68	Petrale sole	607	351-352	2	2
15-Jun-98	79	Petrale sole	607	353-369	2	17
15-Jun-98	78	Petrale sole	607	370-374	2	5
15-Jun-98	86	Petrale sole	607	375	2	1
						75
12-Jun-98	58	Arrowtooth flounder	602	1401-1450	1	**50**
09-Jun-98	31	Rex sole	610	610001-50	9	**50**
07-Jun-98	49	English sole	628	4601-4695	11	95
13-Jun-98	59	English sole	628	4696-4763	16	68
14-Jun-98	66	English sole	628	4764-4842	17	79
16-Jun-98	86	English sole	628	4843-4912	21	70
						312
12-Jun-98	58	Flathead sole	612	612001-50	15	**50**
09-Jun-98	32	Dover sole	626	3001-3065	10	65
14-Jun-98	70	Dover sole	626	3066-3140	18	75
14-Jun-98	72	Dover sole	626	3141-3190	19	50
16-Jun-98	88	Dover sole	626	3191-3229	20	39
						229
				TOTAL FLATFISH		**991**

DATE	TOW	SPECIES	CODE	FISH NO.	TRAY NO.	TOTAL FISH
6-Jun-98	3	Quillback rockfish	424	29401-29413	3	13
06-Jun-98	4	Quillback rockfish	424	29414-2948	3	35
06-Jun-98	5	Quillback rockfish	424	2949	3	1
07-Jun-98	12	Quillback rockfish	424	29450-29453	3	4
07-Jun-98	15	Quillback rockfish	424	29454-29474	3	21
07-Jun-98	39	Quillback rockfish	424	29475-29480	3	6
12-Jun-98	58	Quillback rockfish	424	29481-29485	3	5
						85
06-Jun-98	3	Yelloweye rockfish	442	29486-29488	4	3
06-Jun-98	3	Yelloweye rockfish	442	29489-29493	4	5
06-Jun-98	15	Yelloweye rockfish	442	29494-29495	4	2
						10
07-Jun-98	12	Copper rockfish	407	29446-29502	5	7
07-Jun-98	15	Copper rockfish	407	29503-29505	5	3
07-Jun-98	39	Copper rockfish	407	29506-29508	5	3
						13
				TOTAL ROCKFISH		**108**
				GRAND TOTAL		**1099**

Table 5. Summary statistics for length (cm) frequency data.

Species	Number	Mean	Standard Deviation	Median	Mode
English sole	4993	26.877	7.595	28	18
Arrowtooth flounder	4865	43.243	13.699	47	55
Rock sole	4372	24.656	9.622	21	18
Rex sole	3084	28.546	5.127	29	29
Dover sole	2414	33.363	7.767	32	30
Pacific cod	1215	48.193	18.756	50	74
Flathead sole	565	30.299	7.092	31	24
Pacific halibut	364	71.947	12.406	74	77

Table 6. Summary statistics for length (mm) and weight (g) from samples collected.

Species	Sex	N	Weight (g)			Length (mm)		
			Mean	Standard Deviation	Median	Mean	Standard Deviation	Median
English sole	Males	112	282.5	105.092	264	312.6	38.407	312
	Females	200	472.0	180.863	439	363.4	45.849	362
Dover sole	Males	81	359.2	145.503	327	330.1	46.42	323
	Females	133	627.4	425.735	505	387.9	75.086	379
Rex sole	Males	21	111.2	33.927	117	263.1	25.953	268
	Females	29	170.4	71.397	175	292.9	47.618	302
Rock sole	Males	77	314.4	214.126	292	277.8	71.685	294
	Females	147	548.6	448.901	499	316.6	103.119	337
Petrale sole	Males	23	421.2	233.25	341	326.5	61.574	311
	Females	52	689.1	443.91	617	375.5	84.001	370
Flathead sole	Males	5	180.4	70.408	144	278.0	45.188	273
	Females	45	335.1	126.465	360	310.8	51.635	312

Table 7. Maturity stage for species sampled.

		Males								Females							
		Maturity stage[1]															
		1	2	3	4	5	6	7	Total	1	2	3	4	5	6	7	Total
Rock sole	n	32	4	0	0	1	5	35	77	64	5	19	2	0	0	56	146
	%	14.3	1.8	0.0	0.0	0.4	2.2	15.7		28.7	2.2	8.5	0.9	0.0	0.0	25.1	
Dover sole	n	1	2	0	0	2	31	43	79	57	27	5	0	0	14	45	148
	%	0.4	0.9	0.0	0.0	0.9	13.7	18.9		25.1	11.9	2.2	0.0	0.0	6.2	19.8	
English sole	n	0	1	0	1	27	74	9	112	18	37	91	0	0	2	52	200
	%	0.0	0.3	0.0	0.3	8.7	23.7	2.9		5.8	11.9	29.2	0.0	0.0	0.6	16.7	
Rex sole	n	1	1	1	0	0	4	14	21	3	3	1	1	1	11	10	30
	%	2.0	2.0	2.0	0.0	0.0	8.0	28.0		6.0	6.0	2.0	2.0	2.0	22.0	20.0	
Petrale sole	n	9	2	0	0	0	0	12	23	20	2	1	0	0	1	28	52
	%	12.0	2.7	0.0	0.0	0.0	0.0	16.0		26.7	2.7	1.3	0.0	0.0	1.3	37.3	

[1] Refer to Appendix 1. for description of flatfish maturity codes.

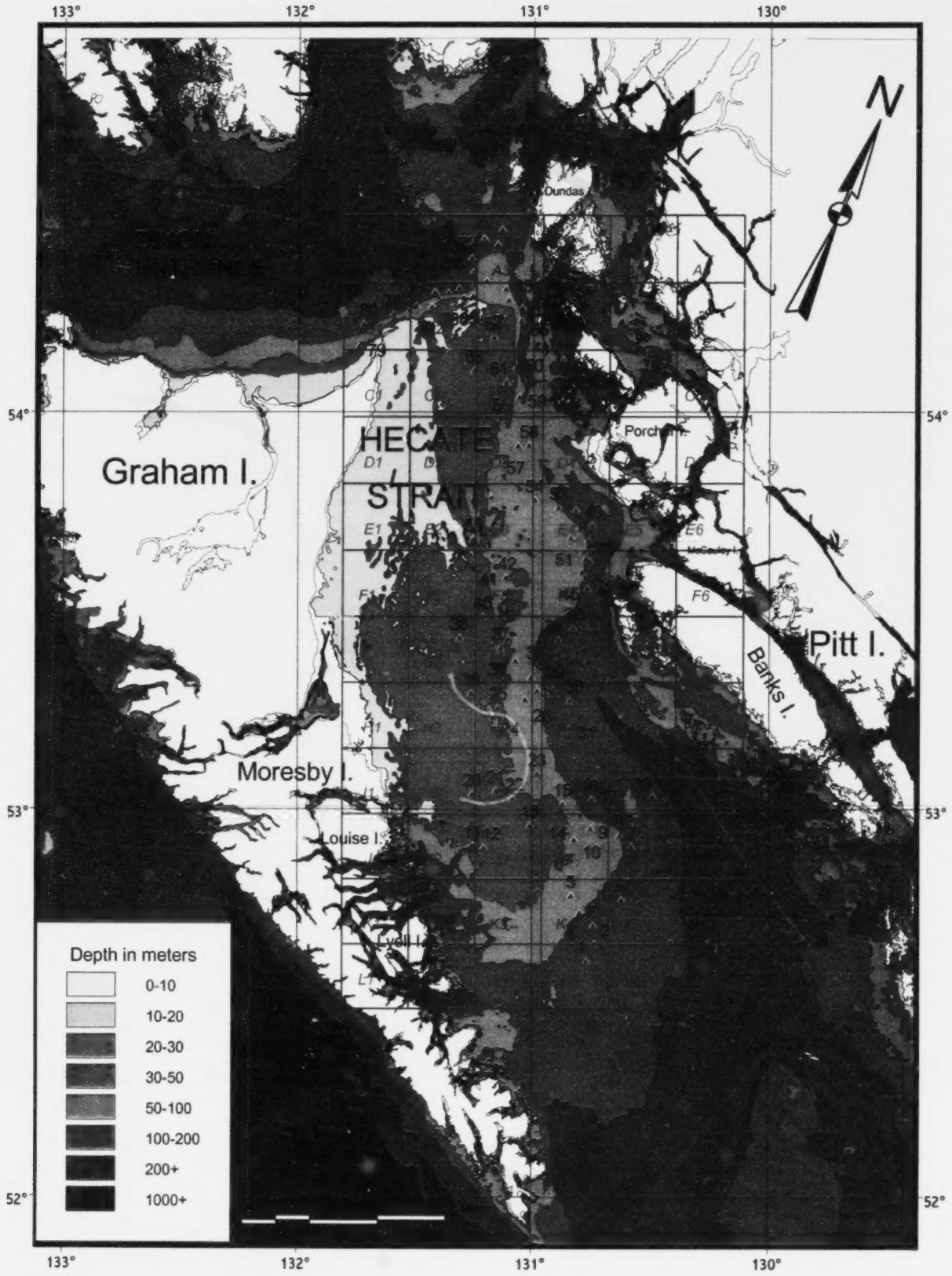


Figure 1. Haul locations and survey grid for the 1998 Hecate Strait on the CCGS W.E. Ricker.

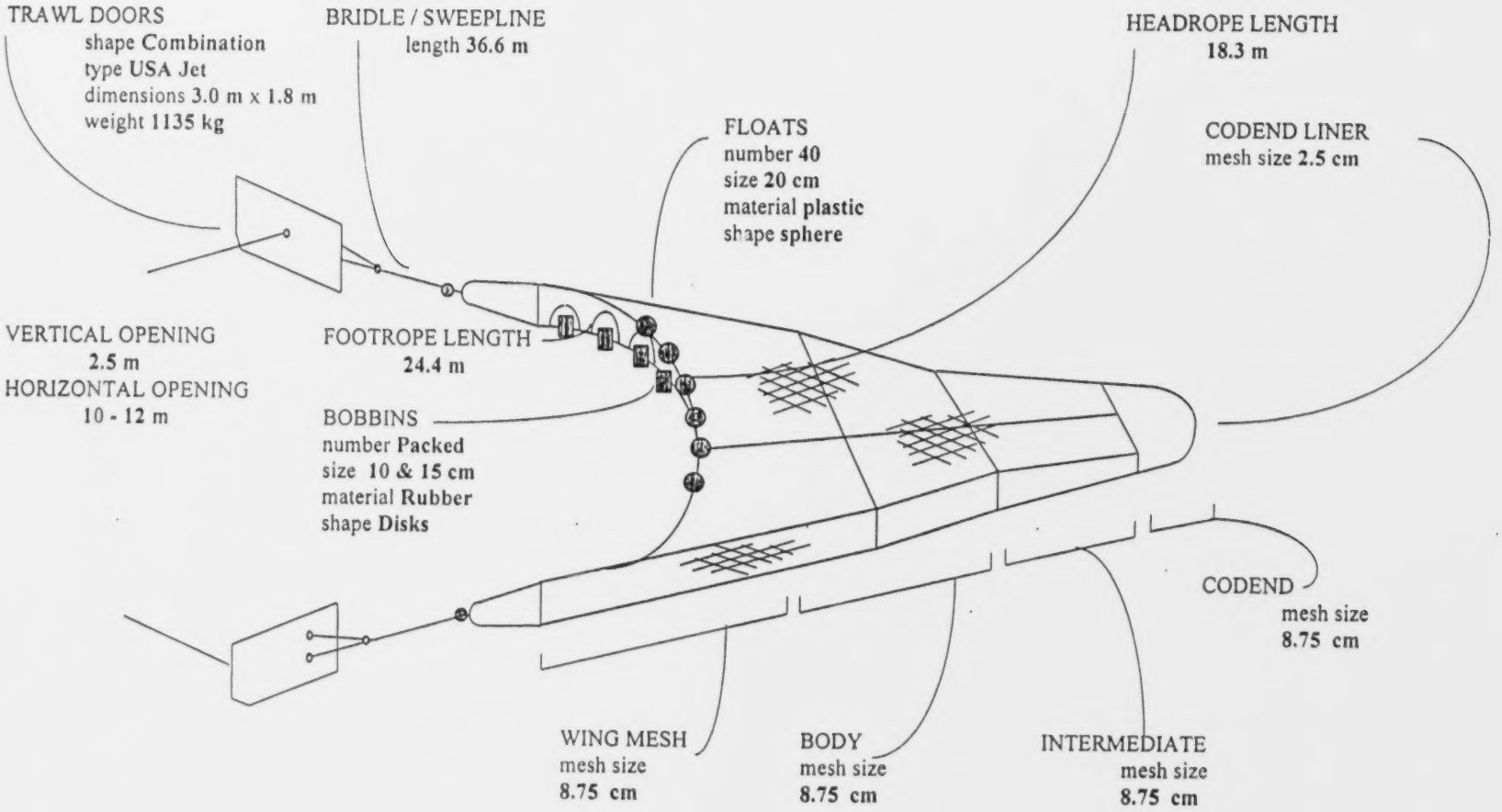


Figure 2. Specifications for the Yankee 36 trawl net used by the CCGS W.E. Ricker.

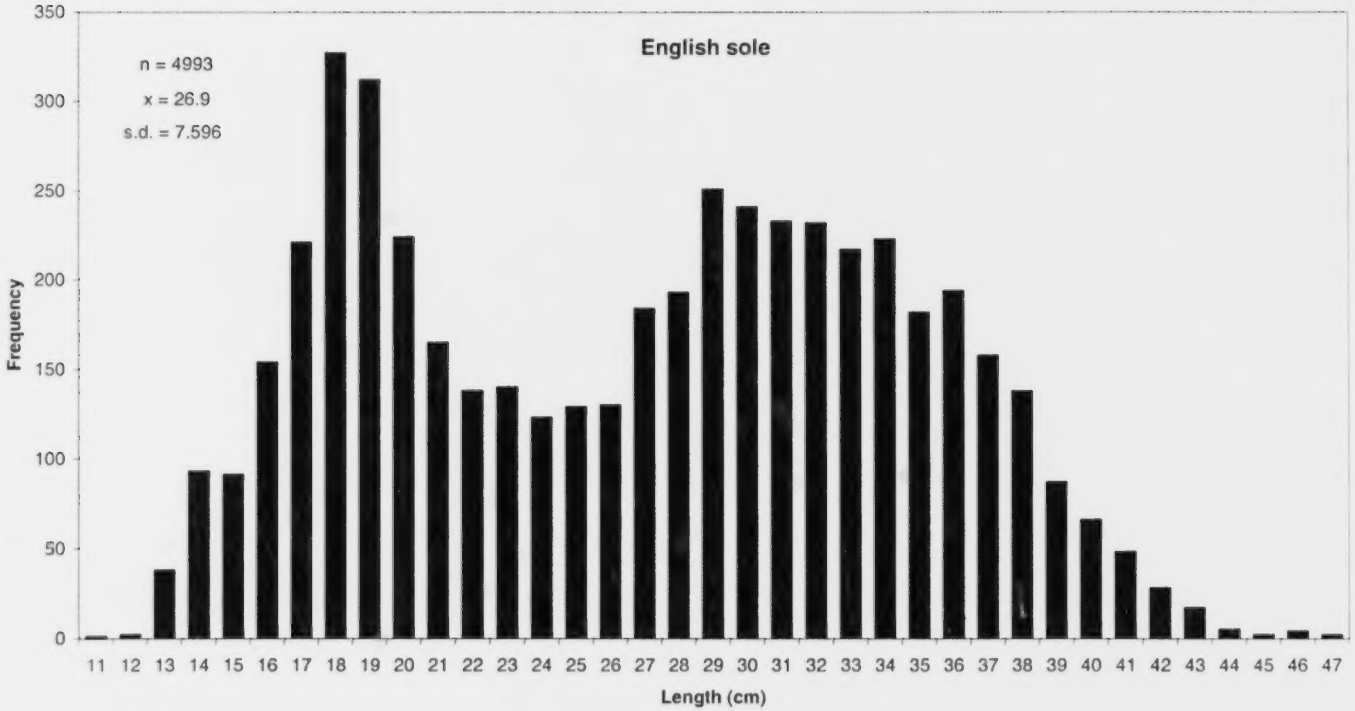


Figure 3. Length frequency histogram for English sole.

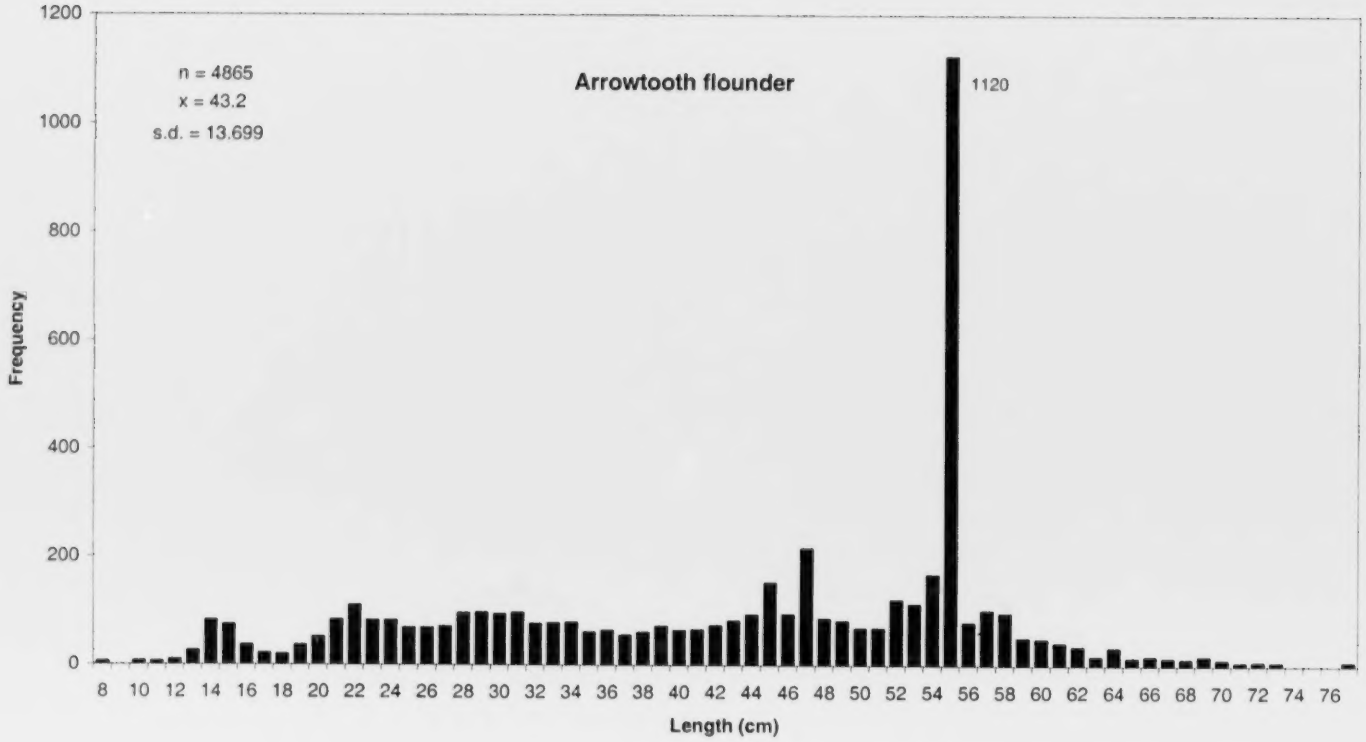


Figure 4. Length frequency histogram for arrowtooth flounder.

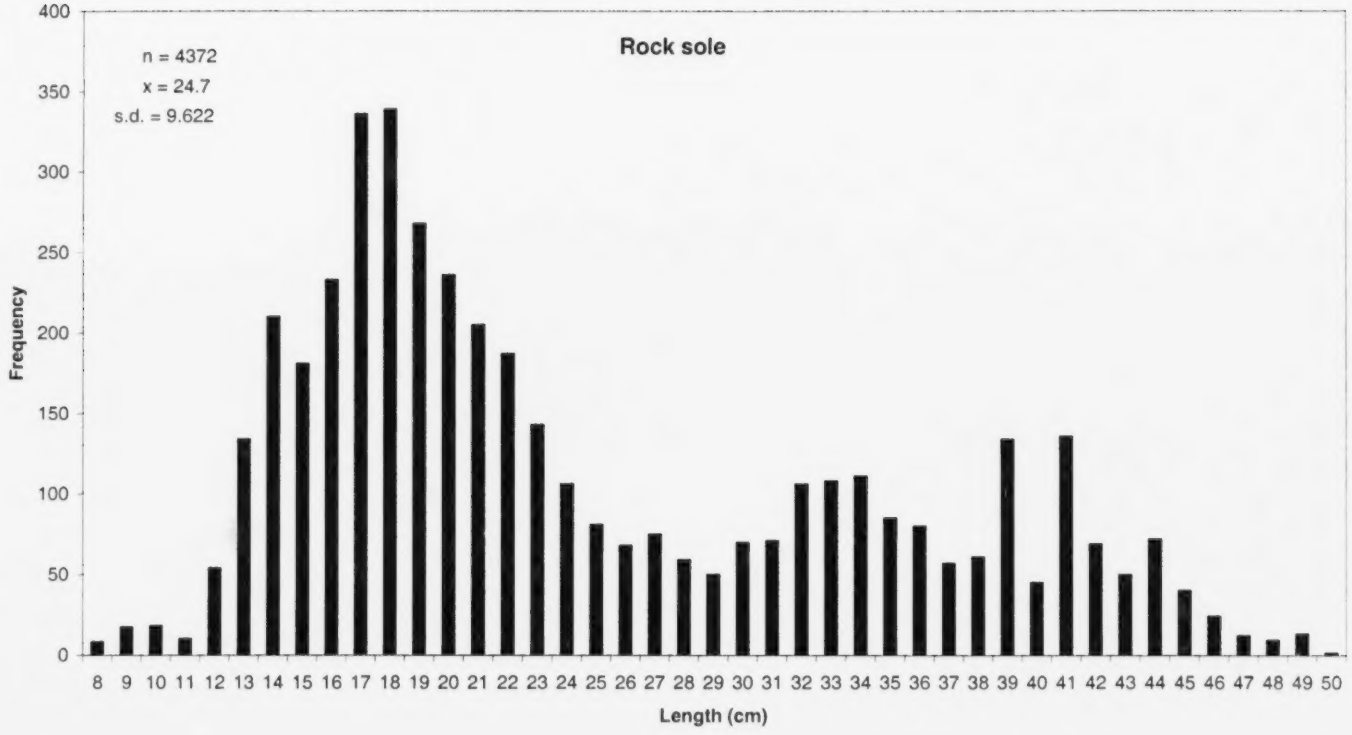


Figure 5. Length frequency histogram for rock sole.

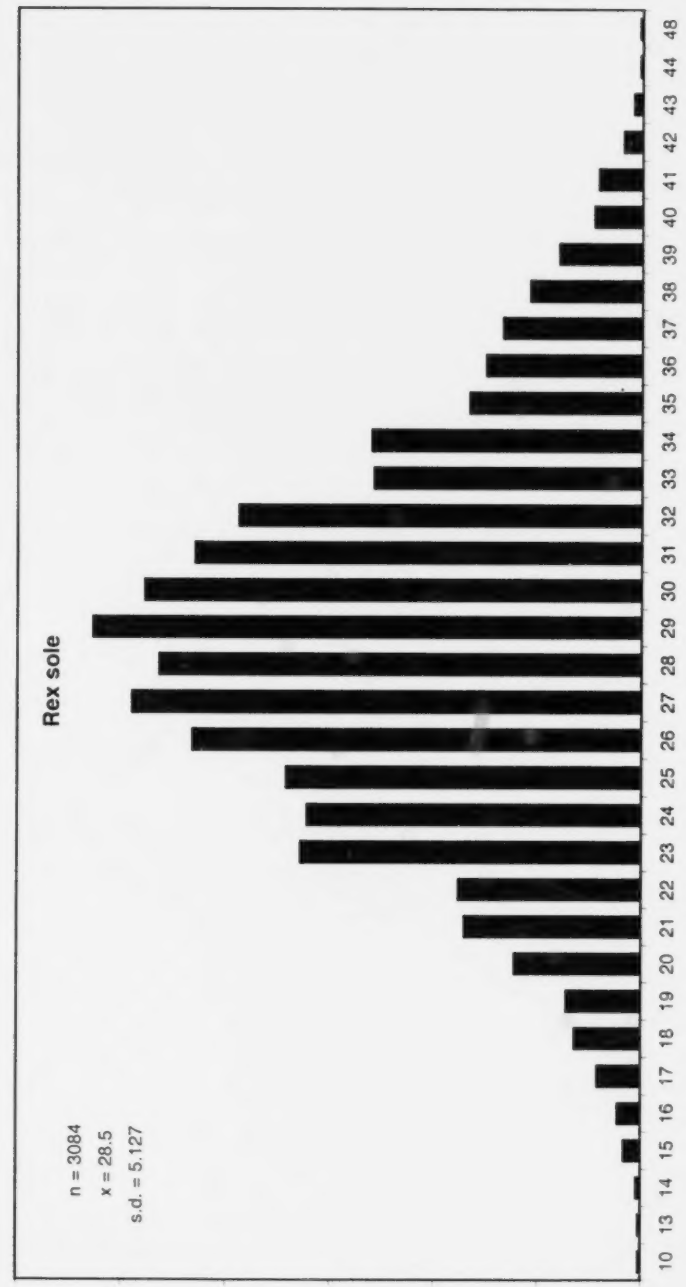


Figure 6. Length frequency histogram for rex sole.

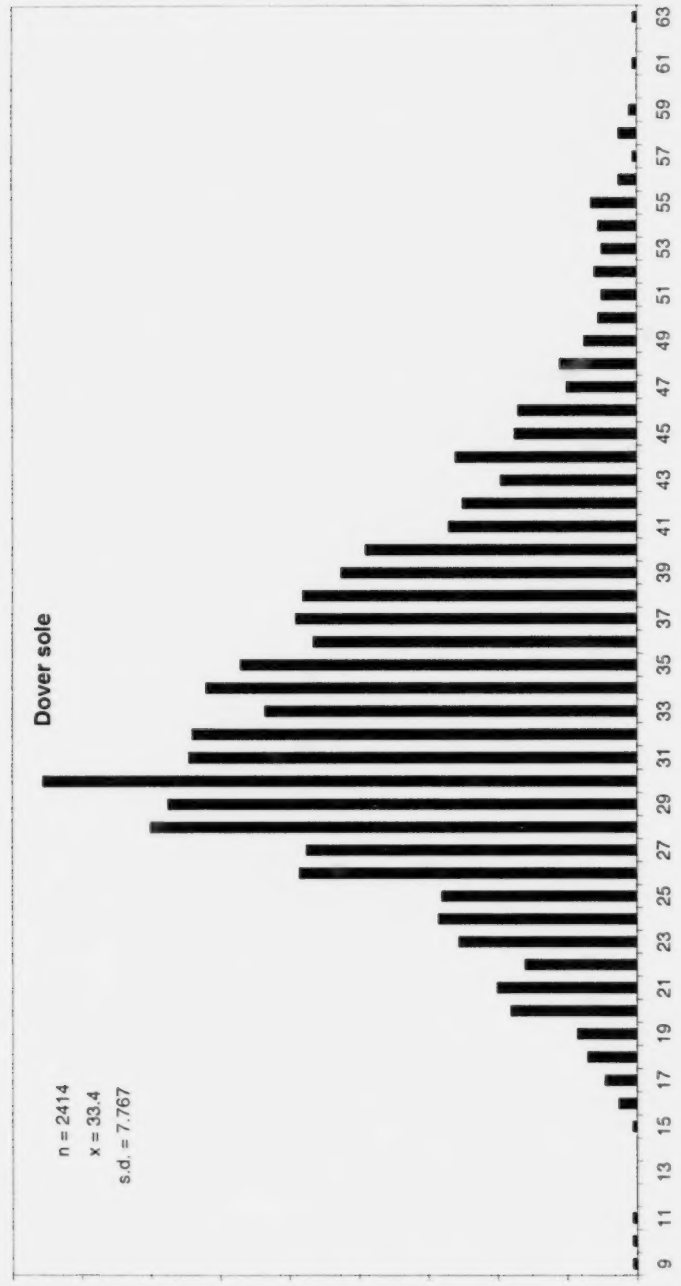


Figure 7. Length frequency histogram for Dover sole.

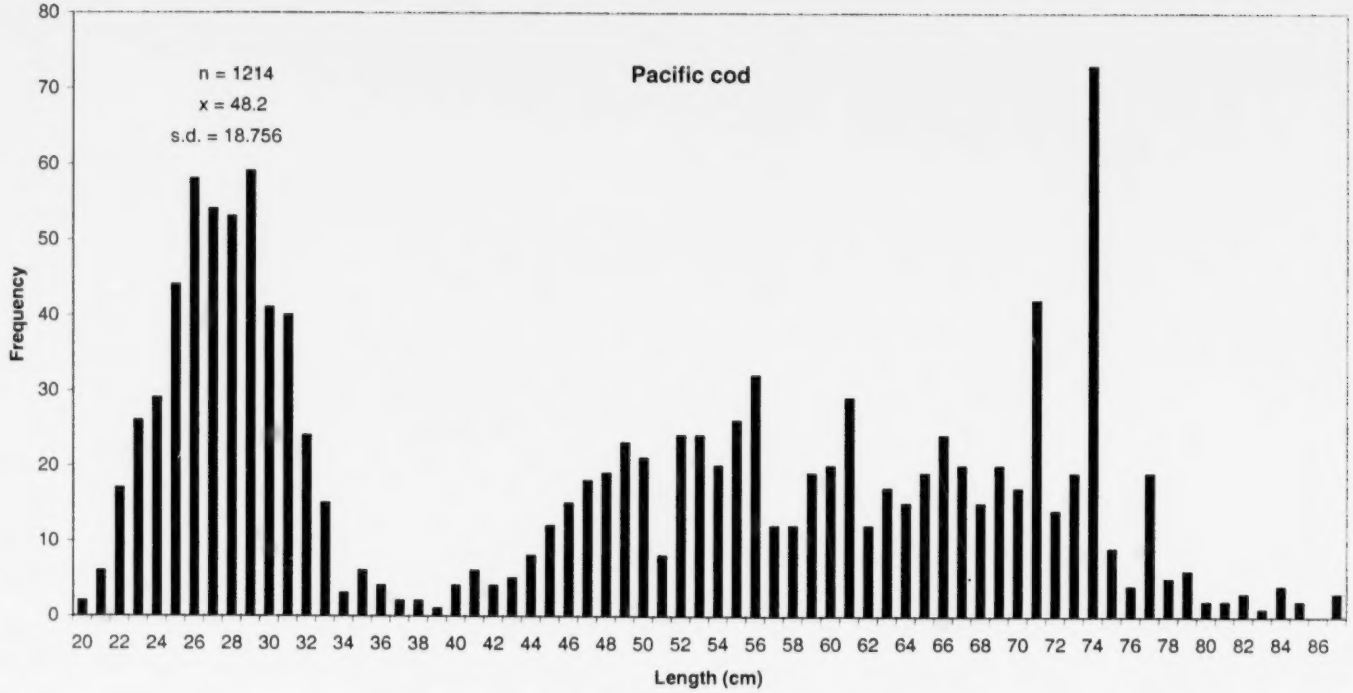


Figure 8. Length frequency histogram for Pacific cod.

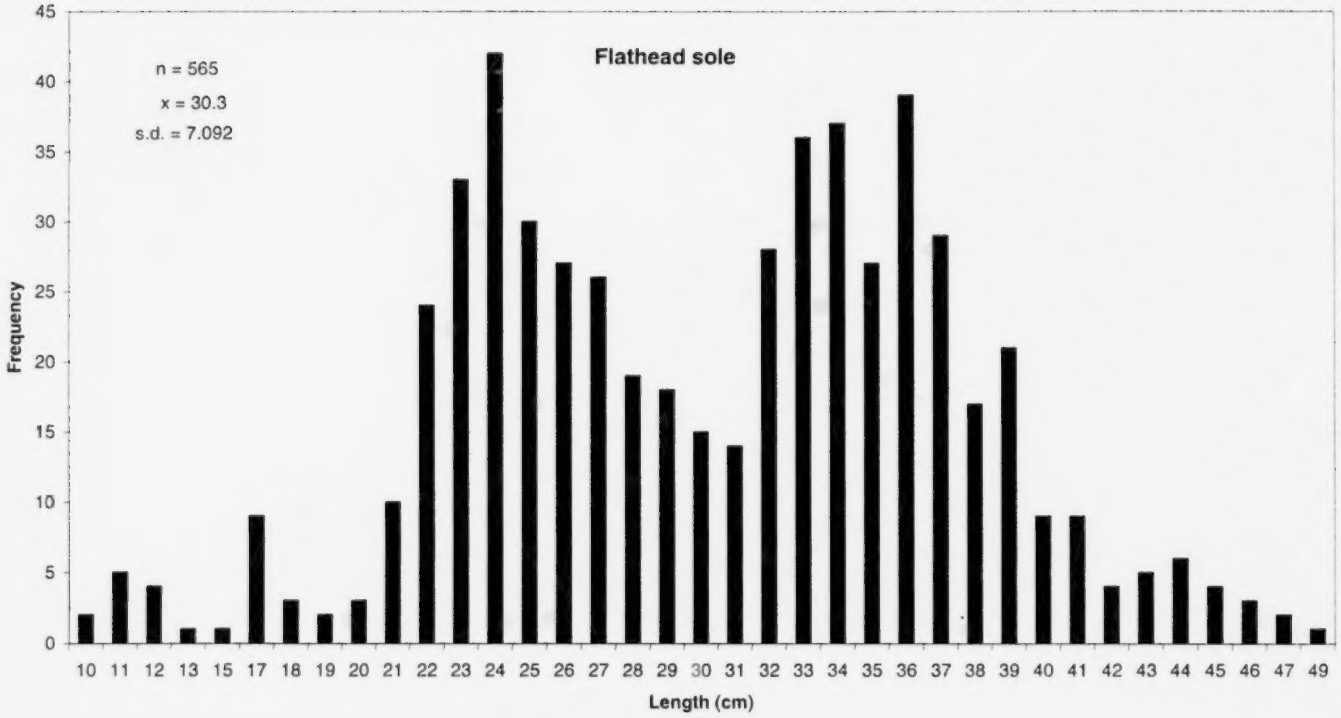


Figure 9. Length frequency histogram for flathead sole.

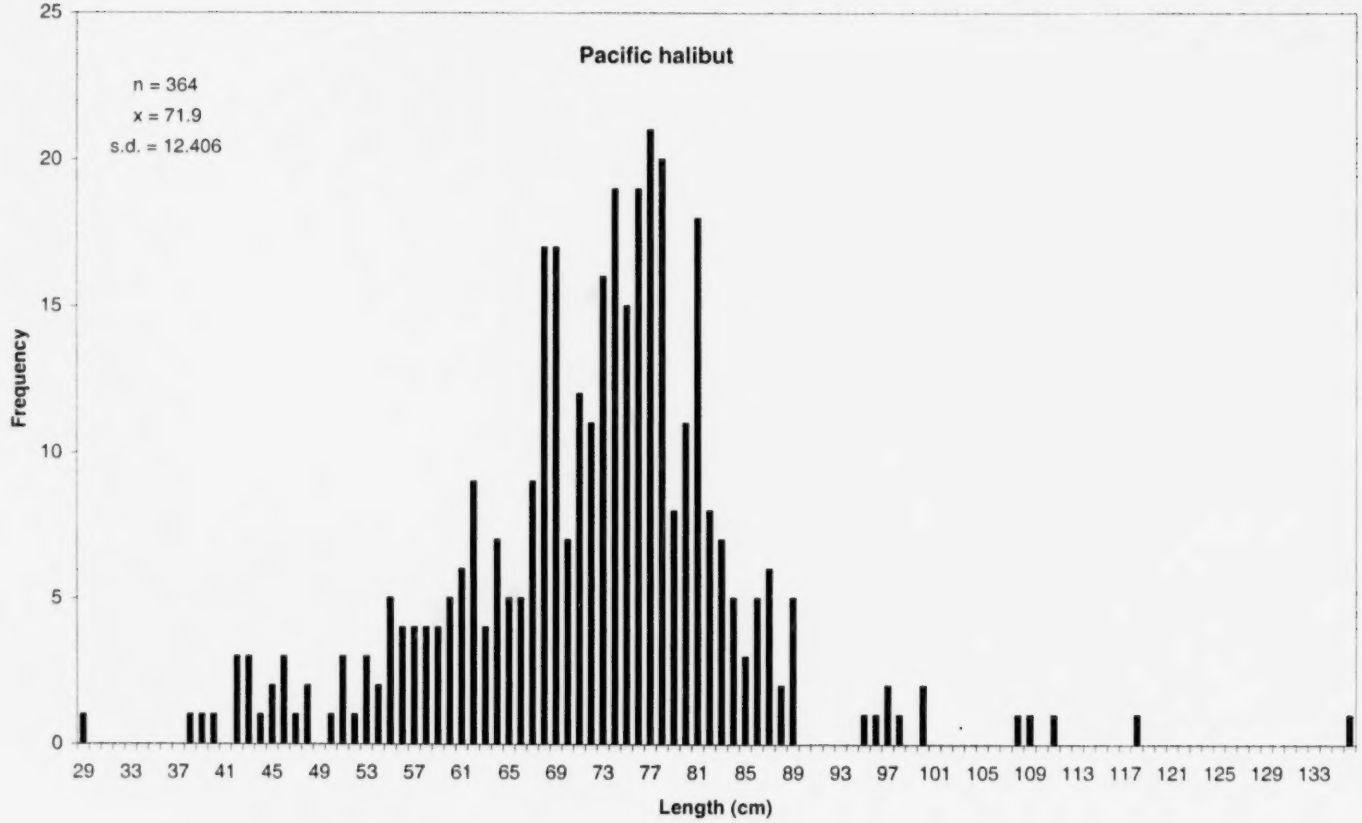


Figure 10. Length frequency histogram for Pacific halibut.

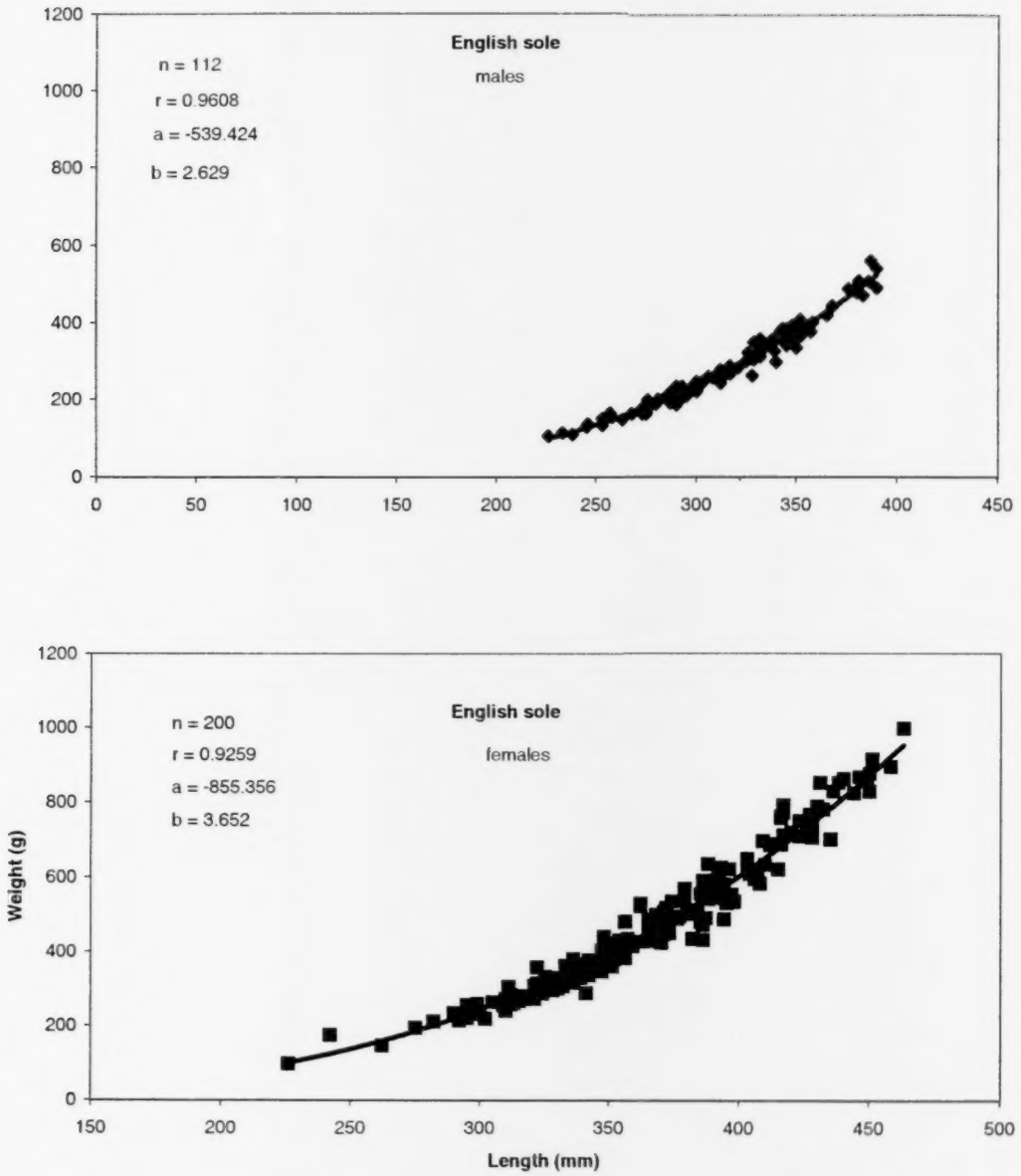


Figure 11. Length - weight relationship by sex for English sole.

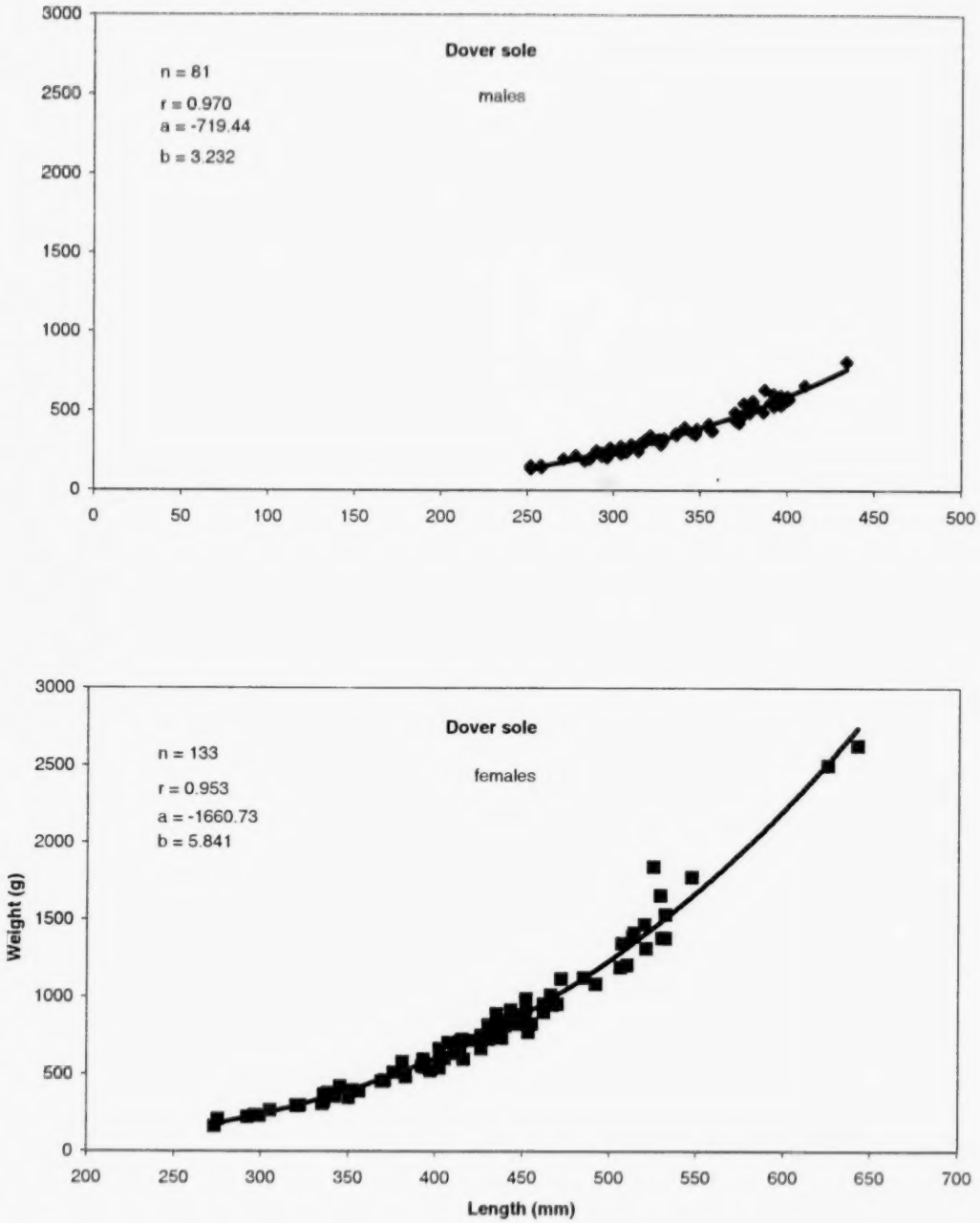
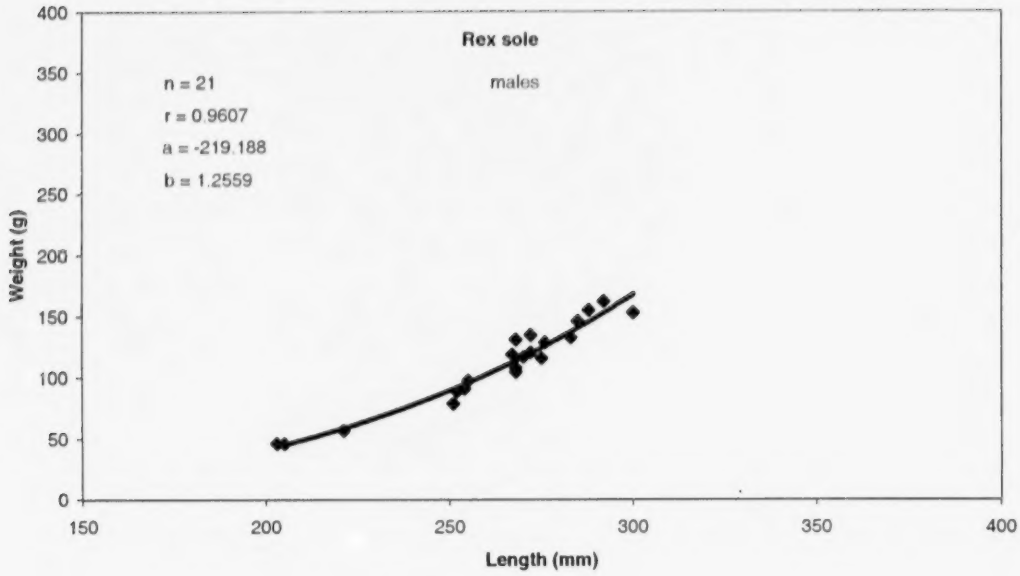


Figure 12. Length - weight relationship by sex for Dover sole.



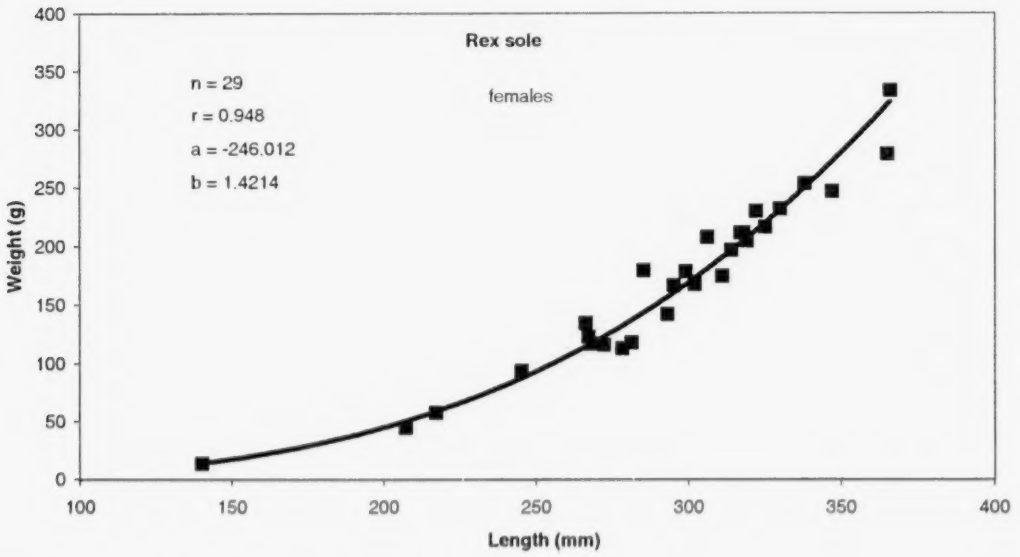
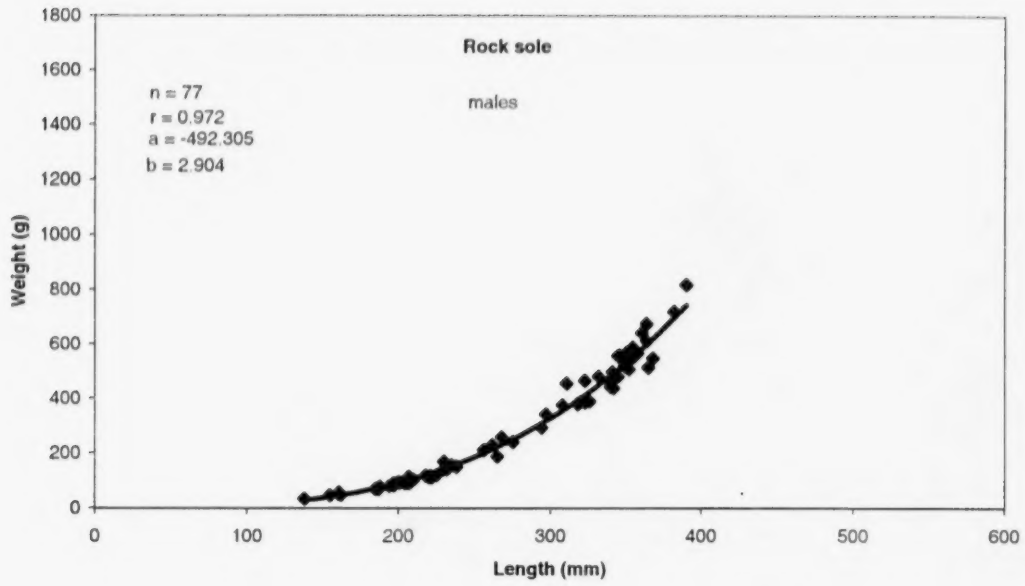


Figure 13. Length - weight relationship by sex for rex sole.



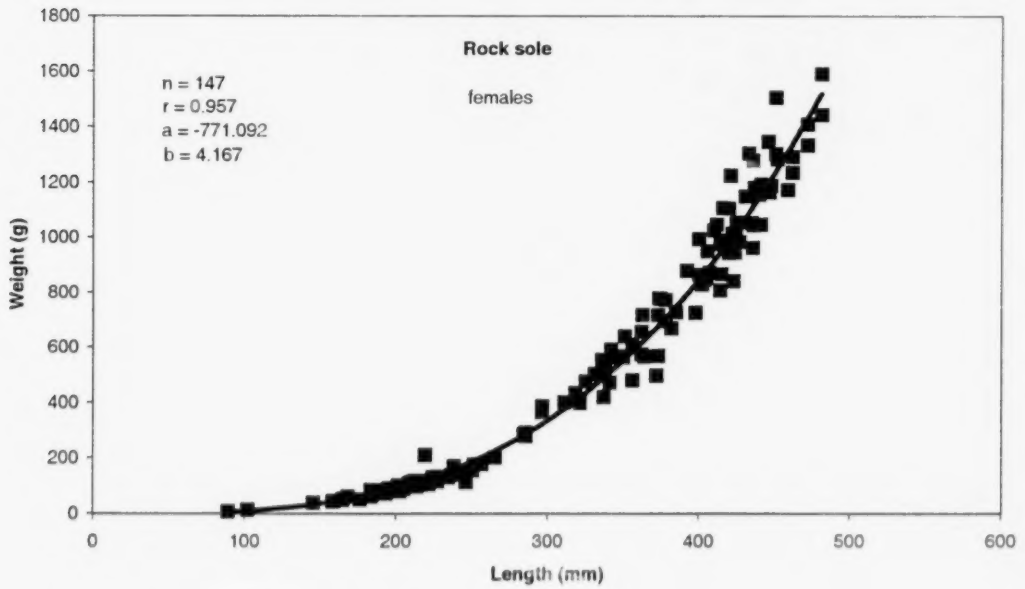
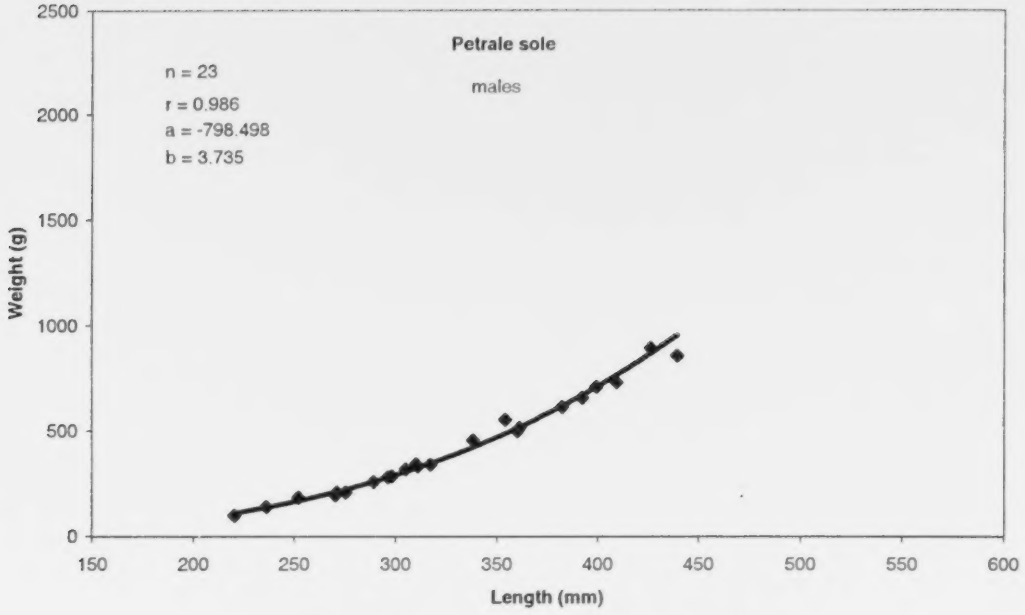


Figure 14. Length - weight relationship by sex for rock sole.



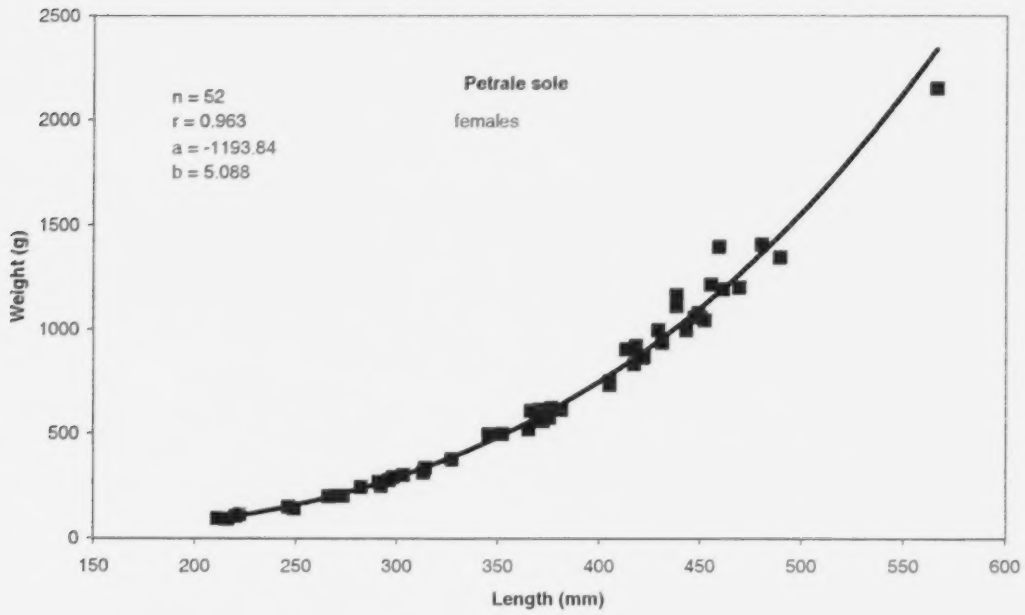


Figure 15. Length- weight relationship by sex for petrale sole.

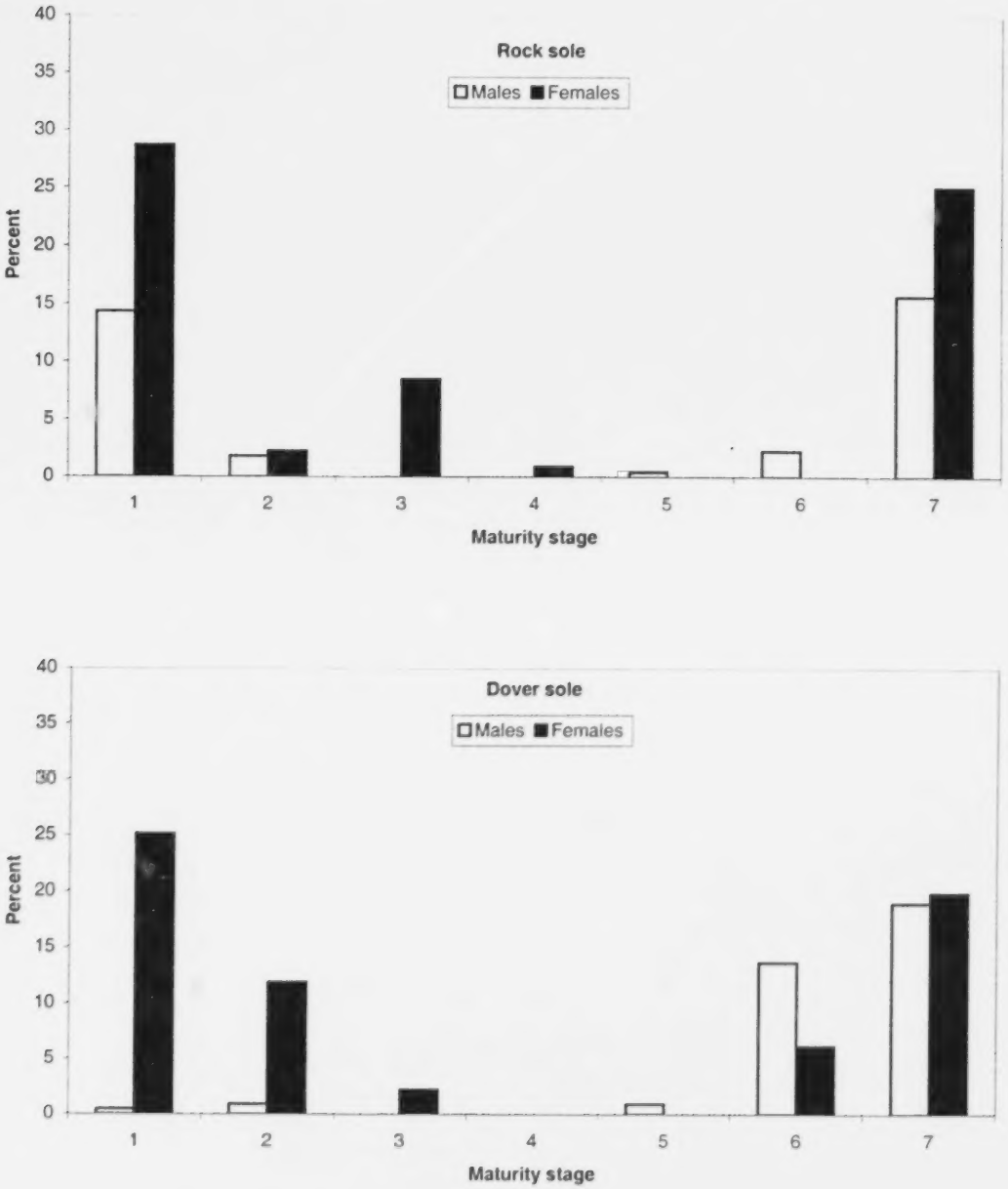


Figure 16. Stage of maturity for rock sole and Dover sole.

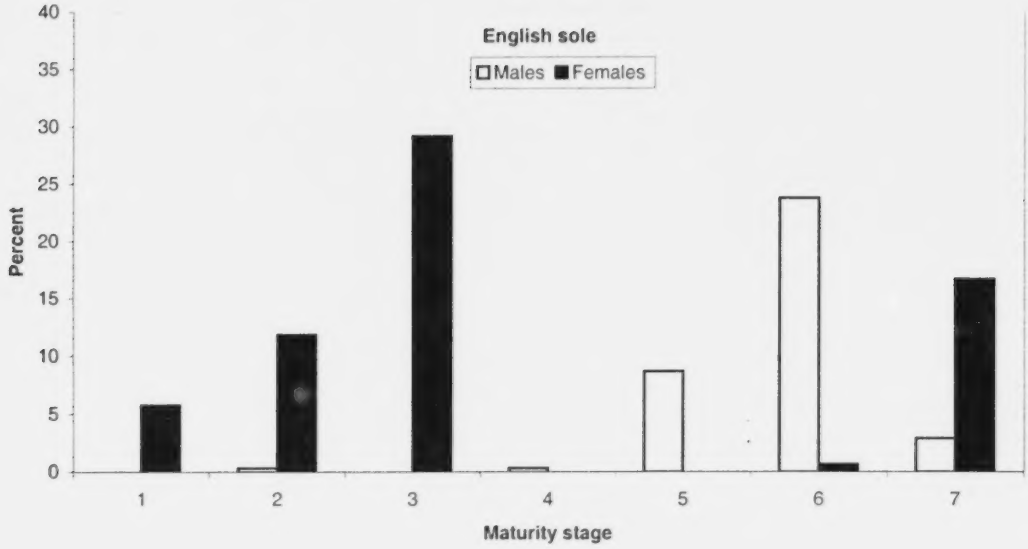


Figure 17. Stage of maturity for English sole.

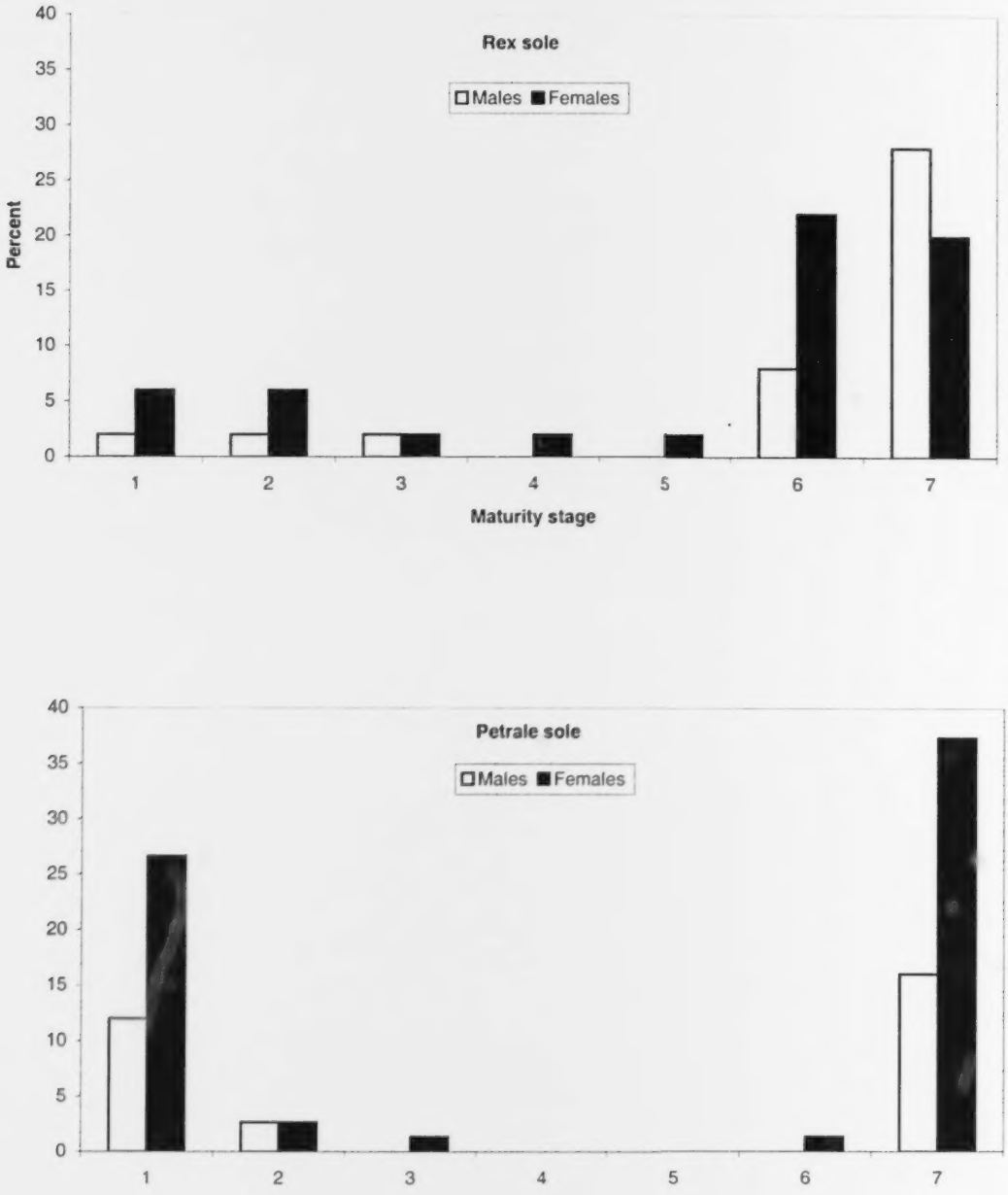


Figure 18. Stage of maturity for rex sole and petrale sole.

Appendix 1. Criteria used for determining sole maturity stage.

Maturity stage	Code	Testes	Ovaries
Immature	1	Testes very small string–like and somewhat translucent or pinkish in colour.	Ovaries very small, translucent or pinkish in colour and somewhat gelatinous in texture.
Maturing	2	Testes enlarged, a distinct bulge evident but still translucent or pinkish in colour.	Ovaries relatively small, pinkish-yellow or cream in colour, granular in texture. No distinct eggs visible.
Developing	3	Testes enlarged, brown-white or white in colour, firm in texture.	Ovaries large, cream or yellow in colour, containing opaque eggs that can be distinguished by direct observation. Sex may be determined externally.
Running Ripe	4	Testes large, white and easily broken. No sperm evident.	Ovaries containing partly or wholly translucent eggs. Sex easily determined externally.
Spawning	5	Testes large, white and sperm evident.	Ovaries containing entirely translucent, mature ova. Eggs loose and will run from oviducts under slight pressure.
Spent	6	Testes flaccid, shrunken and yellow-brown in colour. Sperm ducts enlarged and a small amount of sperm may be present.	Ovaries large, flaccid and purple in colour; a few translucent eggs may be left. Ovarian membrane very bloodshot and sac-like.
Resting	7	Testes firm, small and yellow-brown in colour. Sperm ducts small.	Ovaries contracted and firm, pinkish-grey to cream-yellow in colour and may appear granular in texture but no distinct eggs are visible.

Appendix 2. Bridge log and species catch composition for the CCGS W.E. Ricker groundfish survey in Hecate Strait, June 5 – 17, 1998.

HAUL NO.	1		2		3	
BLOCK	L406		K406		K405	
DATE (1998)	JUNE 06		JUNE 06		JUNE 06	
DURATION (H)	0.50		0.50		0.50	
DIRECTION (DEG. TRUE)	0		35		230	
	START	STOP	START	STOP	START	STOP
TIME (PDT)	6:10	6:40	7:24	7:54	9:16	9:46
LAT.(DEG,MIN)	52 37.4	52 38.7	52 40.1	52 41	52 42.9	52 44.1
LONG.(DEG,MIN)	130 46.1	130 45.5	130 44.1	130 43.4	130 44.4	130 43.2
DEPTH (FA)	62	62	60	62	57	59
SPECIES CATCH(KG.)						
Arrowtooth flounder	50		10		TRACE	
Butter sole	-		-		-	
C-O sole	-		-		-	
Curlfin sole	-		-		-	
Dover sole	2		TRACE		TRACE	
English sole	20		3		TRACE	
Flatfish	-		-		-	
Flathead sole	-		-		-	
Pacific halibut	1		13		-	
Pacific sanddab	30		8		11	
Petrale sole	4		3		TRACE	
Rex sole	29		23		2	
Rock sole (s.)	-		-		TRACE	
Rock sole (n.)	-		-		-	
Sand sole	-		-		-	
Speckled sanddab	-		-		-	
Starry flounder	-		-		-	
Slender sole	-		TRACE		TRACE	
Black rockfish	-		-		-	
Bocaccio	-		-		-	
Canary rockfish	-		-		-	
Copper rockfish	-		-		-	
Darkblotched rockfish	-		-		-	
Greenstriped rockfish	-		-		-	
Harlequin rockfish	-		-		-	
Pacific ocean perch	-		-		-	
Pygmy rockfish	-		-		TRACE	
Quillback rockfish	-		-		11	
Redstripe rockfish	-		-		2	
Silvergray rockfish	15		-		3	
Yelloweye rockfish	-		-		7	
Yellowtail rockfish	-		-		-	
Eelpouts	TRACE		TRACE		-	
Eulachon	-		-		-	
Greenlings	-		-		-	
Lingcod	17		2		-	
Misc. species	-		-		-	
Pacific cod	5		3		-	
Pacific hake	-		-		-	
Pacific herring	3		6		TRACE	
Pacific sardine	-		-		-	
Pacific tomcod	TRACE		TRACE		-	
Poachers	-		TRACE		-	
Red irish lord	-		-		-	
Sablefish	14		6		TRACE	
Salmon	-		-		-	
Sandlance	-		-		-	
Sculpins	TRACE		-		-	
Shiner perch	-		-		-	
Walleye pollock	15		17		TRACE	
Wolfeel	-		-		-	
Big skate	-		-		-	
Longnose skate	-		-		-	
Sandpaper skate	-		-		-	
Spiny dogfish	54		78		23	
Spotted ratfish	12		-		2	
Invertebrates	TRACE		-		-	
TOTAL CATCH (KG.)	271		172		61	
REMARKS	USABLE		USABLE		USABLE	

Appendix 2. (cont'd)

HAUL NO.	4		5		6	
BLOCK	K404		K403		K506	
DATE (1998)	JUNE 06		JUNE 06		JUNE 06	
DURATION (H)	0.50		0.50		0.50	
DIRECTION (DEG. TRUE)	26		292		39	
	START	STOP	START	STOP	START	STOP
TIME (PDT)	10:29	10:59	12:36	13:06	13:19	13:49
LAT.(DEG,MIN)	52 44.9	52 46.1	52 47.5	52 48.6	52 46.9	52 48
LONG.(DEG,MIN)	130 47.8	130 46.6	130 50	130 48.4	130 37.2	130 35.7
DEPTH (FA)	48	46	37	37	64	66
SPECIES CATCH(KG.)						
Arrowtooth flounder	-		-		15	
Butter sole	-		-		-	
C-O sole	TRACE		-		-	
Curlfin sole	-		2		-	
Dover sole	-		-		3	
English sole	TRACE		TRACE		2	
Flatfish	-		-		-	
Flathead sole	-		-		6	
Pacific halibut	35		15		-	
Pacific sanddab	20		7		-	
Petrale sole	TRACE		TRACE		-	
Rex sole	TRACE		TRACE		5	
Rock sole (s.)	TRACE		7		-	
Rock sole (n.)	-		-		-	
Sand sole	-		-		-	
Speckled sanddab	-		-		-	
Starry flounder	-		-		-	
Slender sole	-		-		TRACE	
Black rockfish	-		-		-	
Bocaccio	-		-		-	
Canary rockfish	-		-		-	
Copper rockfish	-		-		-	
Darkblotched rockfish	-		-		-	
Greenstriped rockfish	-		-		-	
Harlequin rockfish	TRACE		-		-	
Pacific ocean perch	-		-		-	
Pygmy rockfish	TRACE		-		-	
Quillback rockfish	40		1		-	
Redstripe rockfish	-		-		-	
Silvergray rockfish	-		-		-	
Yelloweye rockfish	14		-		-	
Yellowtail rockfish	-		-		3	
Eelpouts	-		-		-	
Eulachon	-		-		-	
Greenlings	-		-		-	
Lingcod	-		-		-	
Misc. species	TRACE		-		-	
Pacific cod	-		-		7	
Pacific hake	-		-		TRACE	
Pacific herring	-		TRACE		2	
Pacific sardine	-		-		-	
Pacific tomcod	-		24		-	
Poachers	-		-		-	
Red irish lord	-		-		-	
Sablefish	-		-		TRACE	
Salmon	-		-		-	
Sandlance	-		TRACE		TRACE	
Sculpins	-		-		-	
Shiner perch	-		-		-	
Walleye pollock	-		-		30	
Wolfeel	-		-		-	
Big skate	-		-		-	
Longnose skate	-		-		-	
Sandpaper skate	-		-		-	
Spiny dogfish	29		12		23	
Spotted ratfish	1		TRACE		1	
Invertebrates	-		10		1	
TOTAL CATCH (KG.)	139		78		98	
REMARKS	USABLE		USABLE		USABLE	

Appendix 2. (cont'd)

HAUL NO.	7		8		9	
BLOCK	J505		J504		J403	
DATE (1998)	JUNE 06		JUNE 06		JUNE 06	
DURATION (H)	0.50		0.50		0.50	
DIRECTION (DEG. TRUE)	3		350		65	
	START	STOP	START	STOP	START	STOP
TIME (PDT)	14:58	15:28	16:01	16:31	17:08	17:38
LAT.(DEG,MIN)	52 55	52 56.5	52 56.7	52 57.9	52 57.8	52 57.7
LONG.(DEG,MIN)	130 34.7	130 34.9	130 37.7	130 38.7	130 45.1	130 47.5
DEPTH (FA)	53	53	48	42	35	33
SPECIES CATCH(KG.)						
Arrowtooth flounder	3		-		-	
Butter sole	-		-		-	
C-O sole	-		-		-	
Curlfin sole	-		-		-	
Dover sole	-		-		-	
English sole	TRACE		-		TRACE	
Flatfish	-		-		-	
Flathead sole	-		-		-	
Pacific halibut	6		553		6	
Pacific sanddab	-		-		TRACE	
Petrale sole	TRACE		-		-	
Rex sole	1		-		-	
Rock sole (s.)	-		1		11	
Rock sole (n.)	-		-		-	
Sand sole	-		-		-	
Speckled sanddab	-		-		-	
Starry flounder	-		-		-	
Slender sole	-		-		-	
Black rockfish	-		-		-	
Bocaccio	-		-		-	
Canary rockfish	-		-		-	
Copper rockfish	-		-		-	
Darkblotched rockfish	-		-		-	
Greenstriped rockfish	-		-		-	
Harlequin rockfish	-		-		-	
Pacific ocean perch	-		-		-	
Pygmy rockfish	-		-		-	
Quillback rockfish	-		-		-	
Redstripe rockfish	-		-		-	
Silvergray rockfish	-		-		-	
Yelloweye rockfish	-		-		-	
Yellowtail rockfish	1		-		-	
Eelpouts	-		-		-	
Eulachon	-		-		-	
Greenlings	-		-		-	
Lingcod	-		20		18	
Misc. species	-		-		-	
Pacific cod	-		-		-	
Pacific hake	-		-		-	
Pacific herring	TRACE		-		TRACE	
Pacific sardine	-		-		-	
Pacific tomcod	-		-		-	
Poachers	-		-		-	
Red irish lord	-		-		-	
Sablefish	-		-		-	
Salmon	-		-		-	
Sandlance	TRACE		-		14	
Sculpins	-		-		-	
Shiner perch	-		-		-	
Walleye pollock	1		-		-	
Wolfeel	-		-		-	
Big skate	-		11		5	
Longnose skate	-		-		-	
Sandpaper skate	-		-		-	
Spiny dogfish	16		25		30	
Spotted ratfish	1		-		-	
Invertebrates	2		-		-	
TOTAL CATCH (KG.)	31		610		84	
REMARKS	USABLE		USABLE		USABLE	

Appendix 2. (cont'd)

HAUL NO.	10		11		12	
BLOCK	J402		J203		J201	
DATE (1998)	JUNE 06		JUNE 07		JUNE 07	
DURATION (H)	0.50		0.50		0.25	
DIRECTION (DEG. TRUE)	330		18		147	
	START	STOP	START	STOP	START	STOP
TIME (PDT)	18:30	19:00	6:40	7:10	7:42	7:57
LAT.(DEG,MIN)	52 56.1	52 57.4	52 55.2	52 56.4	52 54.9	52 54.4
LONG.(DEG,MIN)	130 49.2	130 50	131 15.2	131 14	131 12.4	131 12
DEPTH (FA)	24	22	35	31	16	16
SPECIES CATCH(KG.)						
Arrowtooth flounder	-		-		-	
Butter sole	-		-		-	
C-O sole	-		-		-	
Curlfin sole	-		3		-	
Dover sole	-		TRACE		-	
English sole	TRACE		15		TRACE	
Flatfish	-		-		-	
Flathead sole	-		-		-	
Pacific halibut	40		46		-	
Pacific sanddab	TRACE		27		TRACE	
Petrale sole	-		TRACE		-	
Rex sole	-		-		-	
Rock sole (s.)	12		193		6	
Rock sole (n.)	-		-		-	
Sand sole	-		5		-	
Speckled sanddab	TRACE		-		-	
Starry flounder	-		-		-	
Slender sole	-		-		-	
Black rockfish	-		-		-	
Bocaccio	-		-		-	
Canary rockfish	-		-		-	
Copper rockfish	-		-		5	
Darkblotched rockfish	-		-		-	
Greenstriped rockfish	-		-		-	
Harlequin rockfish	-		-		-	
Pacific ocean perch	-		-		-	
Pygmy rockfish	-		-		-	
Quillback rockfish	-		-		2	
Redstripe rockfish	-		-		-	
Silvergray rockfish	-		-		-	
Yelloweye rockfish	-		-		-	
Yellowtail rockfish	-		-		-	
Eelpouts	-		-		-	
Eulachon	-		-		-	
Greenlings	-		-		TRACE	
Lingcod	-		-		-	
Misc. species	-		TRACE		-	
Pacific cod	-		316		-	
Pacific hake	-		-		-	
Pacific herring	-		-		-	
Pacific sardine	TRACE		-		-	
Pacific tomcod	-		-		-	
Poachers	-		-		-	
Red irish lord	-		-		TRACE	
Sablefish	-		TRACE		-	
Salmon	-		-		-	
Sandlance	19		TRACE		11	
Sculpins	-		-		-	
Shiner perch	-		-		-	
Walleye pollock	-		TRACE		-	
Wolfeel	-		-		-	
Big skate	3		-		-	
Longnose skate	-		-		-	
Sandpaper skate	-		-		-	
Spiny dogfish	10		6		-	
Spotted ratfish	-		85		21	
Invertebrates	4		TRACE		-	
TOTAL CATCH (KG.)	88		696		45	
REMARKS	USABLE		USABLE		USABLE	

Appendix 2. (cont'd)

HAUL NO.	13		14		15	
BLOCK	J301		I401		I403	
DATE (1995)	JUNE 07		JUNE 07		JUNE 07	
DURATION (H)	0.50		0.50		0.17	
DIRECTION (DEG. TRUE)	15		345		180	
	START	STOP	START	STOP	START	STOP
TIME (PDT)	9:26	9:56	10:46	11:16	11:44	11:54
LAT.(DEG,MIN)	52 58.3	52 59.6	53 00.4	53 01.7	53 01.5	53 01.1
LONG.(DEG,MIN)	131 00.5	131 00.2	130 53.4	130 54.2	130 52.2	130 51.9
DEPTH (FA)	13	16	15	15	31	29
SPECIES CATCH(KG.)						
Arrowtooth flounder	-		-		-	
Butter sole	-		-		-	
C-O sole	-		-		-	
Curlfin sole	-		-		1	
Dover sole	-		-		-	
English sole	TRACE		TRACE		TRACE	
Flatfish	-		-		-	
Flathead sole	-		-		-	
Pacific halibut	10		15		4	
Pacific sanddab	-		-		TRACE	
Petrale sole	-		-		-	
Rex sole	-		-		-	
Rock sole (s.)	19		38		1	
Rock sole (n.)	-		-		-	
Sand sole	1		5		-	
Speckled sanddab	TRACE		TRACE		-	
Starry flounder	-		-		-	
Slender sole	-		-		-	
Black rockfish	-		-		-	
Bocaccio	-		-		-	
Canary rockfish	-		-		23	
Copper rockfish	-		-		TRACE	
Darkblotched rockfish	-		-		-	
Greenstriped rockfish	-		-		-	
Harlequin rockfish	-		-		-	
Pacific ocean perch	-		-		-	
Pygmy rockfish	-		-		1	
Quillback rockfish	-		-		11	
Redstripe rockfish	-		-		-	
Silvergray rockfish	-		-		-	
Yelloweye rockfish	-		-		3	
Yellowtail rockfish	-		-		108	
Eelpouts	-		-		-	
Eulachon	-		-		-	
Greenlings	-		-		1	
Lingcod	-		12		-	
Misc. species	-		-		-	
Pacific cod	-		TRACE			
Pacific hake	-		-		-	
Pacific herring	TRACE		2		-	
Pacific sardine	-		18		-	
Pacific tomcod	-		-		-	
Poachers	-		-		-	
Red irish lord	-		-		-	
Sablefish	-		-		-	
Salmon	-		-		-	
Sandlance	54		20		-	
Sculpins	TRACE		-		-	
Shiner perch	-		-		-	
Walleye pollock	-		-		-	
Wolfeel	-		-		4	
Big skate	4		-		-	
Longnose skate	-		-		-	
Sandpaper skate	-		-		-	
Spiny dogfish	25		-		-	
Spotted ratfish	-		-		1	
Invertebrates	5		6		18	
TOTAL CATCH (KG.)	118		116		176	
REMARKS	USABLE		USABLE		USABLE	

Appendix 2. (cont'd)

HAUL NO.	16		17		18	
BLOCK	I404		I405		I406	
DATE (1998)	JUNE 07		JUNE 07		JUNE 07	
DURATION (H)	0.50		0.42		0.50	
DIRECTION (DEG. TRUE)	105		315		310	
	START	STOP	START	STOP	START	STOP
TIME (PDT)	12:30	13:00	13:31	13:56	14:22	14:52
LAT.(DEG,MIN)	52 59.8	52 59.6	53 00.6	53 01.4	53 02.2	53 03.3
LONG.(DEG,MIN)	130 47.7	130 45.4	130 43.4	130 44.5	130 44.8	130 46.2
DEPTH (FA)	46	49	59	59	64	64
SPECIES CATCH(KG.)						
Arrowtooth flounder	-		4		-	
Butter sole	-		-		-	
C-O sole	-		-		-	
Curlfin sole	-		-		-	
Dover sole	5		TRACE		-	
English sole	55		9		-	
Flatfish	-		-		-	
Flathead sole	-		TRACE		-	
Pacific halibut	7		-		-	
Pacific sanddab	290		TRACE		-	
Petrale sole	TRACE		-		-	
Rex sole	22		1		-	
Rock sole (s.)	-		-		-	
Rock sole (n.)	-		-		-	
Sand sole	-		-		-	
Speckled sanddab	-		-		-	
Starry flounder	-		-		-	
Slender sole	-		TRACE		-	
Black rockfish	-		-		-	
Bocaccio	-		-		-	
Canary rockfish	-		2		-	
Copper rockfish	-		-		-	
Darkblotched rockfish	-		-		-	
Greenstriped rockfish	-		-		-	
Harlequin rockfish	-		-		-	
Pacific ocean perch	-		-		-	
Pygmy rockfish	TRACE		-		-	
Quillback rockfish	TRACE		-		-	
Redstripe rockfish	-		-		-	
Silvergray rockfish	-		-		-	
Yelloweye rockfish	-		-		-	
Yellowtail rockfish	-		-		-	
Eelpouts	-		-		-	
Eulachon	-		-		-	
Greenlings	-		-		-	
Lingcod	-		4		-	
Misc. species	-		-		-	
Pacific cod	TRACE		-		-	
Pacific hake	-		-		-	
Pacific herring	TRACE		TRACE		-	
Pacific sardine	-		-		-	
Pacific tomcod	79		1		-	
Poachers	-		-		-	
Red irish lord	-		-		-	
Sablefish	88		2		-	
Salmon	-		-		-	
Sandlance	-		-		-	
Sculpins	-		-		-	
Shiner perch	-		-		-	
Walleye pollock	-		16		-	
Wolfeel	6		-		-	
Big skate	-		-		-	
Longnose skate	-		-		-	
Sandpaper skate	-		-		-	
Spiny dogfish	13		68		-	
Spotted ratfish	-		-		-	
Invertebrates	5		TRACE		-	
TOTAL CATCH (KG.)	570		107		0	
REMARKS	USABLE		USABLE		UNUSABLE	

Appendix 2. (cont'd)

HAUL NO.	19		20		21	
BLOCK	I507		I201		I302	
DATE (1998)	JUNE 07		JUNE 08		JUNE 08	
DURATION (H)	0.50		0.57		0.50	
DIRECTION (DEG. TRUE)	140		15		355	
	START	STOP	START	STOP	START	STOP
TIME (PDT)	16:33	17:03	6:18	6:52	8:14	8:44
LAT.(DEG,MIN)	53 02.7	53 01.4	53 03.1	53 04.2	53 03.6	53 04.9
LONG.(DEG,MIN)	130 29.3	130 27.9	131 15.3	131 14.4	131 09.2	131 09.4
DEPTH (FA)	70	79	15	15	20	20
SPECIES CATCH(KG.)						
Arrowtooth flounder	88		-		-	
Butter sole	-		-		-	
C-O sole	-		-		-	
Curlfin sole	-		-		-	
Dover sole	20		-		-	
English sole	39		-		TRACE	
Flatfish	-		-		-	
Flathead sole	TRACE		-		-	
Pacific halibut	-		-		-	
Pacific sanddab	-		-		-	
Petrale sole	5		-		-	
Rex sole	151		-		-	
Rock sole (s.)	-		-		27	
Rock sole (n.)	-		-		-	
Sand sole	-		-		1	
Speckled sanddab	-		-		TRACE	
Starry flounder	-		-		-	
Slender sole	-		-		-	
Black rockfish	-		-		-	
Bocaccio	4		-		-	
Canary rockfish	3		-		-	
Copper rockfish	-		-		-	
Darkblotched rockfish	-		-		-	
Greenstriped rockfish	-		-		-	
Harlequin rockfish	-		-		-	
Pacific ocean perch	18		-		-	
Pygmy rockfish	-		-		-	
Quillback rockfish	1		-		-	
Redstripe rockfish	-		-		-	
Silvergray rockfish	10		-		-	
Yelloweye rockfish	-		-		-	
Yellowtail rockfish	-		-		-	
Eelpouts	-		-		-	
Eulachon	-		-		-	
Greenlings	-		-		-	
Lingcod	-		-		TRACE	
Misc. species	-		-		1	
Pacific cod	1		-		-	
Pacific hake	-		-		-	
Pacific herring	-		-		TRACE	
Pacific sardine	-		-		-	
Pacific tomcod	-		-		-	
Poachers	-		-		-	
Red irish lord	-		-		-	
Sablefish	2		-		-	
Salmon	-		-		-	
Sandlance	-		-		28	
Sculpins	-		-		TRACE	
Shiner perch	-		-		-	
Walleye pollock	5		-		TRACE	
Wolfeel	-		-		-	
Big skate	-		-		26	
Longnose skate	-		-		-	
Sandpaper skate	-		-		-	
Spiny dogfish	8		-		3	
Spotted ratfish	3		-		-	
Invertebrates	-		-		TRACE	
TOTAL CATCH (KG.)	358		0		86	
REMARKS	USABLE		UNUSABLE		USABLE	

Appendix 2. (cont'd)

HAUL NO.	22		23		24	
BLOCK	I301		I303		H302	
DATE (1998)	JUNE 08		JUNE 08		JUNE 08	
DURATION (H)	0.50		0.50		0.50	
DIRECTION (DEG. TRUE)	301		355		353	
	START	STOP	START	STOP	START	STOP
TIME (PDT)	9:31	10:01	10:55	11:25	12:41	13:11
LAT.(DEG,MIN)	53 02.4	53 02.1	53 06.1	53 07.4	53 14.7	53 15.9
LONG.(DEG,MIN)	131 05	131 03.3	130 58.7	130 59.3	131 09.9	131 10.3
DEPTH (FA)	15	18	31	29	22	20
SPECIES CATCH(KG.)						
Arrowtooth flounder	-		TRACE		-	
Butter sole	-		-		-	
C-O sole	-		-		-	
Curlfin sole	-		TRACE		2	
Dover sole	-		-		-	
English sole	TRACE		4		10	
Flatfish	-		-		-	
Flathead sole	-		-		-	
Pacific halibut	17		-		21	
Pacific sanddab	-		19		7	
Petrale sole	-		-		-	
Rex sole	-		-		-	
Rock sole (s.)	54		13		114	
Rock sole (n.)	-		-		-	
Sand sole	1		-		15	
Speckled sanddab	1		-		TRACE	
Starry flounder	-		-		-	
Slender sole	-		-		-	
Black rockfish	-		-		-	
Bocaccio	-		-		-	
Canary rockfish	-		-		-	
Copper rockfish	-		-		-	
Darkblotched rockfish	-		-		-	
Greenstriped rockfish	-		-		-	
Harlequin rockfish	-		-		-	
Pacific ocean perch	-		-		-	
Pygmy rockfish	-		-		-	
Quillback rockfish	-		-		-	
Redstripe rockfish	-		-		-	
Silvergray rockfish	-		-		-	
Yelloweye rockfish	-		-		-	
Yellowtail rockfish	-		-		-	
Eelpouts	-		-		-	
Eulachon	-		-		-	
Greenlings	-		-		-	
Lingcod	-		-		-	
Misc. species	TRACE		-		TRACE	
Pacific cod	-		TRACE		4	
Pacific hake	-		-		-	
Pacific herring	TRACE		-		TRACE	
Pacific sardin	TRACE		-		-	
Pacific tomcod	TRACE		-		-	
Poachers	-		-		TRACE	
Red irish lord	-		-		-	
Sablefish	-		-		-	
Salmon	-		-		-	
Sandlance	36		TRACE		15	
Sculpins	-		-		TRACE	
Shiner perch	-		-		-	
Walleye pollock	TRACE		TRACE		TRACE	
Wolfeel	-		-		-	
Big skate	18		-		16	
Longnose skate	-		6		-	
Sandpaper skate	-		-		-	
Spiny dogfish	11		35		107	
Spotted ratfish	-		58		TRACE	
Invertebrates	1		10		22	
TOTAL CATCH (KG.)	139		145		333	
REMARKS	USABLE		USABLE		USABLE	

Appendix 2. (cont'd)

HAUL NO.	25		26		27	
BLOCK	H301		H303		H304	
DATE (1998)	JUNE 08		JUNE 08		JUNE 08	
DURATION (H)	0.50		0.50		0.35	
DIRECTION (DEG. TRUE)	115		35		160	
	START	STOP	START	STOP	START	STOP
TIME (PDT)	14:34	15:04	14:54	15:24	15:51	16:12
LAT.(DEG,MIN)	53 16.2	53 15.3	53 17.4	53 18.7	53 18.7	53 18.1
LONG.(DEG,MIN)	131 08.7	131 06.9	131 01.8	131 00.9	130 58.8	130 57.8
DEPTH (FA)	18	20	38	38	46	46
SPECIES CATCH(KG.)						
Arrowtooth flounder	-		-		-	
Butter sole	TRACE		-		TRACE	
C-O sole	-		-		-	
Curlfin sole	-		-		-	
Dover sole	-		-		-	
English sole	59		TRACE		1	
Flatfish	-		-		-	
Flathead sole	-		-		-	
Pacific halibut	25		-		-	
Pacific sanddab	21		-		1	
Petrale sole	-		-		-	
Rex sole	-		-		-	
Rock sole (s.)	48		-		-	
Rock sole (n.)	-		-		-	
Sand sole	1		-		-	
Speckled sanddab	TRACE		-		-	
Starry flounder	-		-		-	
Slender sole	-		-		-	
Black rockfish	-		-		-	
Bocaccio	-		-		-	
Canary rockfish	-		-		-	
Copper rockfish	-		-		-	
Darkblotched rockfish	-		-		-	
Greenstriped rockfish	-		-		-	
Harlequin rockfish	-		-		-	
Pacific ocean perch	-		-		-	
Pygmy rockfish	-		-		-	
Quillback rockfish	-		-		-	
Redstripe rockfish	-		-		-	
Silvergray rockfish	-		-		-	
Yelloweye rockfish	-		-		-	
Yellowtail rockfish	-		-		-	
Eelpouts	-		-		-	
Eulachon	-		-		-	
Greenlings	-		-		-	
Lingcod	9		-		-	
Misc. species	TRACE		-		-	
Pacific cod	-		-		-	
Pacific hake	-		-		-	
Pacific herring	TRACE		8		2	
Pacific sardine	-		-		-	
Pacific tomcod	TRACE		-		2	
Poachers	TRACE		TRACE		-	
Red irish lord	-		-		-	
Sablefish	-		-		1	
Salmon	-		-		-	
Sandlance	90		-		-	
Sculpins	TRACE		-		-	
Shiner perch	-		-		-	
Walleye pollock	-		-		-	
Wolfeel	-		-		-	
Big skate	11		-		-	
Longnose skate	-		-		-	
Sandpaper skate	-		-		-	
Spiny dogfish	38		-		-	
Spotted ratfish	-		TRACE		-	
Invertebrates	3		TRACE		-	
TOTAL CATCH (KG.)	305		8		7	
REMARKS	USABLE		USABLE		USABLE	

Appendix 2. (cont'd)

HAUL NO.	28		29		30	
BLOCK	H304		H305		H407	
DATE (1998)	JUNE 08		JUNE 08		JUNE 09	
DURATION (H)	0.50		0.50		0.28	
DIRECTION (DEG. TRUE)	355		160		180	
	START	STOP	START	STOP	START	STOP
TIME (PDT)	16:30	17:00	17:26	17:56	6:10	6:27
LAT.(DEG,MIN)	53 18.3	53 19.6	53 19.5	53 18.2	53 17.3	53 16.6
LONG.(DEG,MIN)	130 56.6	130 57	130 55.5	130 54.9	130 50.4	130 50.3
DEPTH (FA)	49	48	51	55	71	71
SPECIES CATCH(KG.)						
Arrowtooth flounder	3		55		19	
Butter sole	TRACE		-		-	
C-O sole	-		-		-	
Curlfin sole	-		-		-	
Dover sole	TRACE		38		83	
English sole	15		86		11	
Flatfish	-		-		-	
Flathead sole	-		-		12	
Pacific halibut	15		12		-	
Pacific sanddab	6		-		-	
Petrale sole	3		9		-	
Rex sole	9		390		38	
Rock sole (s.)	-		-		-	
Rock sole (n.)	-		-		-	
Sand sole	-		-		-	
Speckled sanddab	-		-		-	
Starry flounder	-		-		-	
Slender sole	-		TRACE		3	
Black rockfish	-		-		-	
Bocaccio	-		-		-	
Canary rockfish	-		-		-	
Copper rockfish	-		-		-	
Darkblotched rockfish	-		-		-	
Greenstriped rockfish	-		-		2	
Harlequin rockfish	-		-		-	
Pacific ocean perch	-		-		10	
Pygmy rockfish	-		-		-	
Quillback rockfish	-		-		-	
Redstripe rockfish	-		-		-	
Silvergray rockfish	-		-		-	
Yelloweye rockfish	-		-		-	
Yellowtail rockfish	-		-		115	
Eelpouts	-		-		TRACE	
Eulachon	-		-		-	
Greenlings	-		-		-	
Lingcod	-		1		-	
Misc. species	-		-		-	
Pacific cod	1		162		6	
Pacific hake	-		-		-	
Pacific herring	9		32		2	
Pacific sardine	-		-		-	
Pacific tomcod	1		-		-	
Poachers	TRACE		TRACE		-	
Red irish lord	-		-		-	
Sablefish	23		15		6	
Salmon	-		-		-	
Sandlance	-		TRACE		TRACE	
Sculpins	-		-		-	
Shiner perch	-		-		-	
Walleye pollock	115		11		-	
Wolfeel	-		-		-	
Big skate	-		14		-	
Longnose skate	-		-		-	
Sandpaper skate	-		-		-	
Spiny dogfish	5		26		8	
Spotted ratfish	3		30		8	
Invertebrates	-		-		-	
TOTAL CATCH (KG.)	208		881		323	
REMARKS	USABLE		USABLE		USABLE	

Appendix 2. (cont'd)

HAUL NO.	31		32		33	
BLOCK	H406		G406		G405	
DATE (1998)	JUNE 09		JUNE 09		JUNE 09	
DURATION (H)	0.50		0.50		0.50	
DIRECTION (DEG. TRUE)	180		225		215	
	START	STOP	START	STOP	START	STOP
TIME (PDT)	7:12	7:42	9:53	10:23	10:53	11:23
LAT.(DEG,MIN)	53 13	53 11.6	53 28.3	53 27.4	53 26.5	53 26.9
LONG.(DEG,MIN)	130 50.6	130 50.7	130 49.6	130 51.3	130 53.4	130 52.8
DEPTH (FA)	64	62	60	62	59	59
SPECIES CATCH(KG.)						
Arrowtooth flounder	19		254		210	
Butter sole	-		-		-	
C-O sole	-		-		-	
Curlfin sole	-		-		-	
Dover sole	9		21		6	
English sole	6		14		62	
Flatfish	-		-		-	
Flathead sole	TRACE		1		TRACE	
Pacific halibut	-		10		5	
Pacific sanddab	-		-		-	
Petrale sole	-		-		2	
Rex sole	34		45		90	
Rock sole (s.)	-		-		-	
Rock sole (n.)	-		-		-	
Sand sole	-		-		-	
Speckled sanddab	-		-		-	
Starry flounder	-		-		-	
Slender sole	1		1		6	
Black rockfish	-		-		-	
Bocaccio	-		-		-	
Canary rockfish	-		-		-	
Copper rockfish	-		-		-	
Darkblotched rockfish	-		-		-	
Greenstriped rockfish	-		-		-	
Harlequin rockfish	-		-		-	
Pacific ocean perch	TRACE		-		-	
Pygmy rockfish	-		-		-	
Quillback rockfish	-		-		-	
Redstripe rockfish	-		-		-	
Silvergray rockfish	-		-		-	
Yelloweye rockfish	-		-		-	
Yellowtail rockfish	4		-		-	
Eelpouts	-		-		-	
Eulachon	-		-		-	
Greenlings	-		-		-	
Lingcod	-		-		-	
Misc. species	-		-		-	
Pacific cod	7		36		41	
Pacific hake	TRACE		-		-	
Pacific herring	TRACE		-		3	
Pacific sardine	-		-		-	
Pacific tomcod	-		-		-	
Poachers	-		TRACE		-	
Red irish lord	-		-		-	
Sablefish	2		4		1	
Salmon	-		-		-	
Sandlance	TRACE		-		-	
Sculpins	-		-		-	
Shiner perch	-		-		-	
Walleye pollock	7		2		-	
Wolfeel	-		-		-	
Big skate	-		-		-	
Longnose skate	-		-		-	
Sandpaper skate	-		-		-	
Spiny dogfish	7		2		28	
Spotted ratfish	4		16		37	
Invertebrates	-		TRACE		-	
TOTAL CATCH (KG.)	100		406		491	
REMARKS	USABLE		USABLE		USABLE	

Appendix 2. (cont'd)

HAUL NO.	34		35		36	
BLOCK	G305		G304		G302	
DATE (1998)	JUNE 09		JUNE 09		JUNE 09	
DURATION (H)	0.50		0.50		0.50	
DIRECTION (DEG. TRUE)	128		354		175	
	START	STOP	START	STOP	START	STOP
TIME (PDT)	12:15	12:45	13:20	13:50	14:48	15:18
LAT.(DEG,MIN)	53 22.4	53 21.1	53 20.8	53 22	53 23.3	53 22
LONG.(DEG,MIN)	130 58.6	130 56.8	131 00.3	131 01	131 04.3	131 04.3
DEPTH (FA)	51	51	44	46	26	29
SPECIES CATCH(KG.)						
Arrowtooth flounder	304		2		-	
Butter sole	-		TRACE		-	
C-O sole	-		-		-	
Curlfin sole	-		-		-	
Dover sole	14		5		TRACE	
English sole	55		45		2	
Flatfish	-		-		-	
Flathead sole	-		-		-	
Pacific halibut	47		18		-	
Pacific sanddab	-		124		15	
Petrale sole	3		-		-	
Rex sole	174		40		-	
Rock sole (s.)	-		1		14	
Rock sole (n.)	-		-		-	
Sand sole	-		-		TRACE	
Speckled sanddab	-		-		-	
Starry flounder	-		-		-	
Slender sole	TRACE		-		-	
Black rockfish	-		-		-	
Bocaccio	8		-		-	
Canary rockfish	-		-		-	
Copper rockfish	-		-		-	
Darkblotched rockfish	-		-		-	
Greenstriped rockfish	-		-		-	
Harlequin rockfish	-		-		-	
Pacific ocean perch	-		-		-	
Pygmy rockfish	-		-		-	
Quillback rockfish	-		-		-	
Redstripe rockfish	-		-		-	
Silvergray rockfish	-		-		-	
Yelloweye rockfish	-		-		-	
Yellowtail rockfish	-		-		-	
Eelpouts	-		-		-	
Eulachon	-		-		-	
Greenlings	-		-		-	
Lingcod	19		4		-	
Misc. species	-		-		-	
Pacific cod	504		-		-	
Pacific hake	-		-		-	
Pacific herring	3		17		2	
Pacific sardine	-		-		-	
Pacific tomcod	-		5		-	
Poachers	-		-		-	
Red irish lord	-		-		-	
Sablefish	38		7		-	
Salmon	-		-		-	
Sandlance	-		-		-	
Sculpins	-		-		-	
Shiner perch	-		-		-	
Walleye pollock	5		-		-	
Wolfeel	-		-		-	
Big skate	-		-		22	
Longnose skate	-		-		-	
Sandpaper skate	-		-		-	
Spiny dogfish	46		9		30	
Spotted ratfish	10		12		1	
Invertebrates	-		-		2	
TOTAL CATCH (KG.)	1230		289		88	
REMARKS	USABLE		USABLE		USABLE	

Appendix 2. (cont'd)

HAUL NO.	37		38		39	
BLOCK	G301		G201		H201	
DATE (1998)	JUNE 09		JUNE 09		JUNE 10	
DURATION (H)	0.50		0.50		0.50	
DIRECTION (DEG. TRUE)	304		120		320	
	START	STOP	START	STOP	START	STOP
TIME (PDT)	15:55	16:25	17:25	17:55	6:16	6:46
LAT.(DEG,MIN)	53 25.3	53 26.1	53 26.8	53 25.9	53 18.4	53 19.3
LONG.(DEG,MIN)	131 08.1	131 09.7	131 18.6	131 16.5	131 15.7	131 17.2
DEPTH (FA)	18	18	13	13	15	13
SPECIES CATCH(KG.)						
Arrowtooth flounder	-		-		-	
Butter sole	-		-		-	
C-O sole	-		-		-	
Curlfin sole	-		-		2	
Dover sole	-		-		-	
English sole	-		-		-	
Flatfish	-		-		-	
Flathead sole	-		-		-	
Pacific halibut	7		32		-	
Pacific sanddab	-		-		-	
Petrale sole	-		-		-	
Rex sole	-		-		-	
Rock sole (s.)	183		44		19	
Rock sole (n.)	-		-		-	
Sand sole	9		3		-	
Speckled sanddab	-		-		-	
Starry flounder	-		-		-	
Slender sole	-		-		-	
Black rockfish	-		-		-	
Bocaccio	-		-		-	
Canary rockfish	-		-		-	
Copper rockfish	-		-		3	
Darkblotched rockfish	-		-		-	
Greenstriped rockfish	-		-		-	
Harlequin rockfish	-		-		-	
Pacific ocean perch	-		-		-	
Pygmy rockfish	-		-		-	
Quillback rockfish	-		-		7	
Redstripe rockfish	-		-		-	
Silvergray rockfish	-		-		-	
Yelloweye rockfish	-		-		-	
Yellowtail rockfish	-		-		-	
Eelpouts	-		-		-	
Eulachon	-		-		-	
Greenlings	-		-		2	
Lingcod	-		-		-	
Misc. species	-		-		-	
Pacific cod	1126		-		-	
Pacific hake	-		-		-	
Pacific herring	-		1		-	
Pacific sardine	-		-		-	
Pacific tomcod	-		-		-	
Poachers	-		TRACE		-	
Red irish lord	-		4		-	
Sablefish	-		-		-	
Salmon	-		-		-	
Sandlance	TRACE		-		-	
Sculpins	-		TRACE		-	
Shiner perch	-		-		-	
Walleye pollock	-		-		-	
Wolfeel	-		-		-	
Big skate	-		2		-	
Longnose skate	-		-		-	
Sandpaper skate	-		-		-	
Spiny dogfish	157		1500		850	
Spotted ratfish	-		-		-	
Invertebrates	-		26		25	
TOTAL CATCH (KG.)	1482		1612		908	
REMARKS	USABLE		USABLE		USABLE	

Appendix 2. (cont'd)

HAUL NO.	40		41		42	
BLOCK	F201		F302		F303	
DATE (1998)	JUNE 10		JUNE 10		JUNE 10	
DURATION (H)	0.50		0.53		0.50	
DIRECTION (DEG. TRUE)	340		5		35	
	START	STOP	START	STOP	START	STOP
TIME (PDT)	8:27	8:57	9:54	10:26	10:50	11:20
LAT.(DEG,MIN)	53 30	53 31.3	53 33.5	53 34.9	53 35.9	53 37.1
LONG.(DEG,MIN)	131 12.7	131 13.1	131 07.3	131 06.8	131 06.8	131 05.2
DEPTH (FA)	15	15	27	27	35	27
SPECIES CATCH(KG.)						
Arrowtooth flounder	-		-		-	
Butter sole	-		-		-	
C-O sole	-		-		-	
Curlfin sole	TRACE		TRACE		1	
Dover sole	-		-		-	
English sole	TRACE		3		3	
Flatfish	-		-		-	
Flathead sole	-		-		-	
Pacific halibut	8		-		8	
Pacific sanddab	-		TRACE		TRACE	
Petrale sole	-		-		-	
Rex sole	-		-		-	
Rock sole (s.)	-		90		199	
Rock sole (n.)	-		-		-	
Sand sole	1		1		4	
Speckled sanddab	TRACE		-		TRACE	
Starry flounder	17		-		-	
Slender sole	-		-		-	
Black rockfish	-		-		-	
Bocaccio	-		-		-	
Canary rockfish	-		-		-	
Copper rockfish	-		-		-	
Darkblotched rockfish	-		-		-	
Greenstriped rockfish	-		-		-	
Harlequin rockfish	-		-		-	
Pacific ocean perch	-		-		-	
Pygmy rockfish	-		-		-	
Quillback rockfish	-		-		-	
Redstripe rockfish	-		-		-	
Silvergray rockfish	-		-		-	
Yelloweye rockfish	-		-		-	
Yellowtail rockfish	-		-		-	
Eelpouts	-		-		-	
Eulachon	-		-		-	
Greenlings	-		-		-	
Lingcod	-		-		-	
Misc. species	-		-		-	
Pacific cod	-		23		6	
Pacific hake	-		-		-	
Pacific herring	1		-		-	
Pacific sardine	-		-		-	
Pacific tomcod	-		-		-	
Poachers	TRACE		TRACE		-	
Red irish lord	-		-		-	
Sablefish	-		-		-	
Salmon	-		-		-	
Sandlance	TRACE		-		-	
Sculpins	TRACE		TRACE		TRACE	
Shiner perch	-		-		-	
Walleye pollock	TRACE		-		TRACE	
Wolfeel	-		-		-	
Big skate	12		2		51	
Longnose skate	-		-		-	
Sandpaper skate	-		-		-	
Spiny dogfish	29		4		-	
Spotted ratfish	-		-		-	
Invertebrates	TRACE		-		-	
TOTAL CATCH (KG.)	68		123		272	
REMARKS	USABLE		USABLE		USABLE	

Appendix 2. (cont'd)

HAUL NO.	43		44		45	
BLOCK	F405		F406		F404	
DATE (1998)	JUNE 10		JUNE 10		JUNE 10	
DURATION (H)	0.50		0.50		0.50	
DIRECTION (DEG. TRUE)	185		175		10	
	START	STOP	START	STOP	START	STOP
TIME (PDT)	13:05	13:35	14:18	14:48	15:42	16:12
LAT.(DEG,MIN)	53 38.8	53 37.5	53 34.3	53 33	53 36.7	53 37.8
LONG.(DEG,MIN)	130 46.4	130 46.6	130 46	130 46.4	130 47.4	130 46.8
DEPTH (FA)	55	53	60	66	44	46
SPECIES CATCH(KG.)						
Arrowtooth flounder	3		71		10	
Butter sole	-		-		-	
C-O sole	-		-		-	
Curlfin sole	-		-		-	
Dover sole	-		1		TRACE	
English sole	-		1		4	
Flatfish	-		-		-	
Flathead sole	-		TRACE		TRACE	
Pacific halibut	-		4		-	
Pacific sanddab	-		-		TRACE	
Petrale sole	-		-		-	
Rex sole	TRACE		18		14	
Rock sole (s.)	-		-		-	
Rock sole (n.)	-		-		-	
Sand sole	-		-		-	
Speckled sanddab	-		-		-	
Starry flounder	-		-		-	
Slender sole	-		TRACE		-	
Black rockfish	-		-		-	
Bocaccio	-		-		-	
Canary rockfish	-		-		-	
Copper rockfish	-		-		-	
Darkblotched rockfish	-		-		-	
Greenstriped rockfish	-		-		-	
Harlequin rockfish	-		-		-	
Pacific ocean perch	-		-		-	
Pygmy rockfish	-		-		-	
Quillback rockfish	-		-		-	
Redstripe rockfish	-		-		-	
Silvergray rockfish	-		-		-	
Yelloweye rockfish	-		-		-	
Yellowtail rockfish	-		1		-	
Eelpouts	-		-		-	
Eulachon	-		-		-	
Greenlings	-		-		-	
Lingcod	-		-		-	
Misc. species	-		-		-	
Pacific cod	4		32		7	
Pacific hake	-		-		-	
Pacific herring	TRACE		2		1	
Pacific sardine	-		-		-	
Pacific tomcod	-		-		TRACE	
Poachers	-		-		-	
Red irish lord	-		-		-	
Sablefish	-		-		1	
Salmon	-		-		-	
Sandlance	-		-		-	
Sculpins	-		-		-	
Shiner perch	-		-		-	
Walleye pollock	1		48		69	
Wolfeel	-		-		-	
Big skate	-		-		-	
Longnose skate	-		-		-	
Sandpaper skate	-		-		-	
Spiny dogfish	TRACE		-		6	
Spotted ratfish	TRACE		4		1	
Invertebrates	TRACE		-		-	
TOTAL CATCH (KG.)	8		182		113	
REMARKS	USABLE		USABLE		USABLE	

Appendix 2. (cont'd)

HAUL NO.	46		47		48	
BLOCK	F407		F403		E407	
DATE (1998)	JUNE 10		JUNE 10		JUNE 11	
DURATION (H)	0.50		0.50		0.50	
DIRECTION (DEG. TRUE)	25		187		175	
	START	STOP	START	STOP	START	STOP
TIME (PDT)	16:44	17:14	18:15	18:45	7:05	7:35
LAT.(DEG,MIN)	53 38.3	53 39.3	53 39.8	53 38.3	53 43.8	53 42.3
LONG.(DEG,MIN)	130 45.4	130 43.7	130 46.9	130 47.2	130 44.9	130 44.2
DEPTH (FA)	73	79	37	38	70	70
SPECIES CATCH(KG.)						
Arrowtooth flounder	67		TRACE		149	
Butter sole	-		TRACE		-	
C-O sole	-		-		-	
Curlfin sole	-		-		-	
Dover sole	-		-		162	
English sole	TRACE		14		TRACE	
Flatfish	-		-		-	
Flathead sole	-		-		10	
Pacific halibut	-		22		-	
Pacific sanddab	-		12		TRACE	
Petrale sole	-		-		-	
Rex sole	14		2		71	
Rock sole (s.)	-		-		TRACE	
Rock sole (n.)	-		-		-	
Sand sole	-		-		-	
Speckled sanddab	-		-		-	
Starry flounder	-		-		-	
Slender sole	1		-		12	
Black rockfish	-		-		-	
Bocaccio	-		-		-	
Canary rockfish	-		-		-	
Copper rockfish	-		-		-	
Darkblotched rockfish	-		-		-	
Greenstriped rockfish	-		-		-	
Harlequin rockfish	-		-		-	
Pacific ocean perch	-		-		-	
Pygmy rockfish	-		-		-	
Quillback rockfish	-		-		-	
Redstripe rockfish	-		-		-	
Silvergray rockfish	4		5		-	
Yelloweye rockfish	-		-		-	
Yellowtail rockfish	-		-		-	
Eelpouts	-		-		-	
Eulachon	TRACE		-		23	
Greenlings	-		-		-	
Lingcod	-		-		-	
Misc. species	-		-		-	
Pacific cod	-		TRACE		3	
Pacific hake	-		-		-	
Pacific herring	-		6		-	
Pacific sardine	-		-		-	
Pacific tomcod	-		14		-	
Poachers	-		-		-	
Red irish lord	-		-		-	
Sablefish	2		TRACE		11	
Salmon	-		-		-	
Sandlance	-		-		-	
Sculpins	-		-		-	
Shiner perch	-		-		-	
Walleye pollock	10		TRACE		1	
Wolfeel	-		-		-	
Big skate	-		-		-	
Longnose skate	-		-		5	
Sandpaper skate	-		-		-	
Spiny dogfish	-		-		-	
Spotted ratfish	8		2		31	
Invertebrates	TRACE		-		-	
TOTAL CATCH (KG.)	106		77		478	
REMARKS	USABLE		USABLE		USABLE	

Appendix 2. (cont'd)

HAUL NO.	49		50		51	
BLOCK	E405		E403		E402	
DATE (1998)	JUNE 11		JUNE 11		JUNE 11	
DURATION (H)	0.50		0.53		0.50	
DIRECTION (DEG. TRUE)	320		155		310	
	START	STOP	START	STOP	START	STOP
TIME (PDT)	8:09	8:39	9:09	9:41	10:10	10:40
LAT.(DEG,MIN)	53 41.6	53 42.8	53 43.2	53 41.8	53 41.9	53 42.7
LONG.(DEG,MIN)	130 45.9	130 47	130 48.2	130 46.8	130 50.2	130 52.1
DEPTH (FA)	57	53	38	37	24	26
SPECIES CATCH(KG.)						
Arrowtooth flounder	95		2		-	
Butter sole	-		1		-	
C-O sole	-		-		-	
Curlfin sole	-		-		-	
Dover sole	10		-		-	
English sole	33		4		TRACE	
Flatfish	-		-		-	
Flathead sole	5		-		-	
Pacific halibut	3		93		TRACE	
Pacific sanddab	-		3		TRACE	
Petrale sole	-		1		-	
Rex sole	112		1		-	
Rock sole (s.)	-		3		79	
Rock sole (n.)	-		-		-	
Sand sole	1		-		-	
Speckled sanddab	-		-		-	
Starry flounder	-		-		-	
Slender sole	-		-		-	
Black rockfish	-		-		-	
Bocaccio	4		-		-	
Canary rockfish	-		-		-	
Copper rockfish	-		-		-	
Darkblotched rockfish	-		-		-	
Greenstriped rockfish	-		-		-	
Harlequin rockfish	-		-		-	
Pacific ocean perch	-		-		-	
Pygmy rockfish	-		-		-	
Quillback rockfish	-		-		-	
Redstripe rockfish	-		-		-	
Silvergray rockfish	2		-		-	
Yelloweye rockfish	-		-		-	
Yellowtail rockfish	-		-		-	
Eelpouts	-		-		-	
Eulachon	TRACE		-		-	
Greenlings	-		-		-	
Lingcod	-		-		12	
Misc. species	TRACE		-		-	
Pacific cod	48		TRACE		-	
Pacific hake	1		-		-	
Pacific herring	3		45		TRACE	
Pacific sardine	-		-		-	
Pacific tomcod	-		7		-	
Poachers	TRACE		-		TRACE	
Red irish lord	-		-		-	
Sablefish	7		TRACE		-	
Salmon	-		-		-	
Sandlance	-		-		-	
Sculpins	-		-		-	
Shiner perch	-		-		-	
Walleye pollock	399		31		-	
Wolfeel	-		-		-	
Big skate	-		-		58	
Longnose skate	-		-		-	
Sandpaper skate	-		-		-	
Spiny dogfish	7		6		3	
Spotted ratfish	5		12		193	
Invertebrates	-		-		4	
TOTAL CATCH (KG.)	735		209		349	
REMARKS	USABLE		USABLE		USABLE	

Appendix 2. (cont'd)

HAUL NO.	52		53		54	
BLOCK	E406		E404		E302	
DATE (1998)	JUNE 11		JUNE 11		JUNE 11	
DURATION (H)	0.50		0.43		0.50	
DIRECTION (DEG. TRUE)	330		360		325	
	START	STOP	START	STOP	START	STOP
TIME (PDT)	11:23	11:53	12:30	12:56	13:33	14:03
LAT.(DEG,MIN)	53 46.1	53 47.2	53 46.5	53 47	53 47.6	53 48.5
LONG.(DEG,MIN)	130 49	130 50.1	130 53.4	130 55	130 59.5	131 00.5
DEPTH (FA)	60	60	48	49	26	27
SPECIES CATCH(KG.)						
Arrowtooth flounder	96		27		-	
Butter sole	-		-		-	
C-O sole	-		-		-	
Curlfin sole	-		-		1	
Dover sole	100		84		TRACE	
English sole	1		40		23	
Flatfish	-		-		-	
Flathead sole	49		66		-	
Pacific halibut	-		-		11	
Pacific sanddab	TRACE		-		TRACE	
Petrale sole	-		-		-	
Rex sole	108		156		-	
Rock sole (s.)	TRACE		TRACE		63	
Rock sole (n.)	-		-		-	
Sand sole	-		-		TRACE	
Speckled sanddab	-		-		-	
Starry flounder	-		-		-	
Slender sole	24		8		-	
Black rockfish	-		-		-	
Bocaccio	-		-		-	
Canary rockfish	-		-		-	
Copper rockfish	-		-		-	
Darkblotched rockfish	-		-		-	
Greenstriped rockfish	-		-		-	
Harlequin rockfish	-		-		-	
Pacific ocean perch	-		-		-	
Pygmy rockfish	-		-		-	
Quillback rockfish	-		-		-	
Redstripe rockfish	-		-		-	
Silvergray rockfish	-		-		-	
Yelloweye rockfish	-		-		-	
Yellowtail rockfish	-		-		-	
Eelpouts	-		-		TRACE	
Eulachon	2		-		TRACE	
Greenlings	-		-		-	
Lingcod	1		-		-	
Misc. species	TRACE		-		-	
Pacific cod	1		5		9	
Pacific hake	-		-		-	
Pacific herring	TRACE		TRACE		TRACE	
Pacific sardine	-		-		-	
Pacific tomcod	-		4		-	
Poachers	-		TRACE		TRACE	
Red irish lord	-		-		-	
Sablefish	15		6		8	
Salmon	-		-		-	
Sandlance	-		-		-	
Sculpins	-		-		TRACE	
Shiner perch	-		-		-	
Walleye pollock	25		286		TRACE	
Wolfeel	-		-		-	
Big skate	-		-		15	
Longnose skate	-		-		-	
Sandpaper skate	-		-		-	
Spiny dogfish	1		1		6	
Spotted ratfish	54		28		99	
Invertebrates	-		-		TRACE	
TOTAL CATCH (KG.)	477		711		235	
REMARKS	USABLE		USABLE		USABLE	

Appendix 2. (cont'd)

HAUL NO.	55		56		57	
BLOCK	E202		D302		D303	
DATE (1998)	JUNE 11		JUNE 12		JUNE 12	
DURATION (H)	0.50		0.50		0.50	
DIRECTION (DEG. TRUE)	330		140		335	
	START	STOP	START	STOP	START	STOP
TIME (PDT)	16:12	16:42	6:17	6:47	7:28	7:58
LAT.(DEG,MIN)	53 41.7	53 42.8	53 59.8	53 58.7	53 55.7	53 56.9
LONG.(DEG,MIN)	131 15.2	131 16.3	131 08.2	131 07	131 03.8	131 04.4
DEPTH (FA)	26	24	20	20	38	38
SPECIES CATCH(KG.)						
Arrowtooth flounder	-		TRACE		45	
Butter sole	-		-		TRACE	
C-O sole	-		-		-	
Curlfin sole	-		1		-	
Dover sole	1		-		8	
English sole	86		6		55	
Flatfish	-		-		-	
Flathead sole	-		-		2	
Pacific halibut	7		42		6	
Pacific sanddab	9		TRACE		111	
Petrale sole	-		-		TRACE	
Rex sole	TRACE		-		33	
Rock sole (s.)	5		10		TRACE	
Rock sole (n.)	1		3		TRACE	
Sand sole	18		-		-	
Speckled sanddab	-		-		-	
Starry flounder	4		-		-	
Slender sole	-		-		TRACE	
Black rockfish	54		-		-	
Bocaccio	-		-		-	
Canary rockfish	-		-		-	
Copper rockfish	-		-		-	
Darkblotched rockfish	-		-		-	
Greenstriped rockfish	-		-		-	
Harlequin rockfish	-		-		-	
Pacific ocean perch	-		-		-	
Pygmy rockfish	-		-		-	
Quillback rockfish	-		-		-	
Redstripe rockfish	-		-		-	
Silvergray rockfish	-		-		-	
Yelloweye rockfish	-		-		-	
Yellowtail rockfish	-		-		TRACE	
Eelpouts	-		-		-	
Eulachon	-		-		TRACE	
Greenlings	-		-		-	
Lingcod	-		-		-	
Misc. species	-		TRACE		-	
Pacific cod	2		4		12	
Pacific hake	-		-		-	
Pacific herring	2		5		4	
Pacific sardine	-		-		-	
Pacific tomcod	TRACE		-		8	
Poachers	1		TRACE		TRACE	
Red irish lord	-		-		-	
Sablefish	2		-		32	
Salmon	-		-		-	
Sandlance	-		-		TRACE	
Sculpins	-		TRACE		-	
Shiner perch	-		-		-	
Walleye pollock	-		-		83	
Wolfeel	-		-		-	
Big skate	17		10		54	
Longnose skate	-		-		-	
Sandpaper skate	-		-		-	
Spiny dogfish	-		1		-	
Spotted ratfish	-		43		70	
Invertebrates	-		1		1	
TOTAL CATCH (KG.)	209		126		524	
REMARKS	USABLE		USABLE		USABLE	

Appendix 2. (cont'd)

HAUL NO.	58		59		60	
BLOCK	D304		C304		C305	
DATE (1998)	JUNE 12		JUNE 12		JUNE 12	
DURATION (H)	0.50		0.50		0.50	
DIRECTION (DEG. TRUE)	322		360		330	
	START	STOP	START	STOP	START	STOP
TIME (PDT)	8:32	9:02	10:03	10:33	11:00	11:30
LAT.(DEG,MIN)	53 55.8	53 56.8	54 03	54 04.3	54 05.7	54 06.9
LONG.(DEG,MIN)	131 01	131 02.2	131 03.5	131 03.4	131 02.7	131 03.6
DEPTH (FA)	42	40	46	44	51	51
SPECIES CATCH(KG.)						
Arrowtooth flounder	214		113		172	
Butter sole	2		TRACE		-	
C-O sole	-		-		-	
Curlfin sole	-		-		-	
Dover sole	2		41		29	
English sole	5		80		25	
Flatfish	-		-		-	
Flathead sole	99		10		2	
Pacific halibut	-		3		4	
Pacific sanddab	TRACE		-		-	
Petrale sole	-		-		-	
Rex sole	13		83		61	
Rock sole (s.)	3		TRACE		-	
Rock sole (n.)	9		-		-	
Sand sole	-		-		-	
Speckled sanddab	-		-		-	
Starry flounder	-		-		-	
Slender sole	-		TRACE		-	
Black rockfish	-		-		-	
Bocaccio	-		-		-	
Canary rockfish	-		-		-	
Copper rockfish	-		-		-	
Darkblotched rockfish	-		-		-	
Greenstriped rockfish	-		-		-	
Harlequin rockfish	-		-		-	
Pacific ocean perch	-		-		-	
Pygmy rockfish	-		-		-	
Quillback rockfish	4		-		-	
Redstripe rockfish	-		-		-	
Silvergray rockfish	-		-		-	
Yelloweye rockfish	-		-		-	
Yellowtail rockfish	-		-		-	
Eelpouts	-		TRACE		-	
Eulachon	-		7		TRACE	
Greenlings	-		-		-	
Lingcod	-		-		12	
Misc. species	-		-		-	
Pacific cod	30		19		116	
Pacific hake	-		-		-	
Pacific herring	-		-		-	
Pacific sardine	-		-		-	
Pacific tomcod	TRACE		16		TRACE	
Poachers	TRACE		-		-	
Red irish lord	-		-		-	
Sablefish	4		6		2	
Salmon	-		-		-	
Sandlance	-		-		-	
Sculpins	-		-		-	
Shiner perch	-		-		-	
Walleye pollock	68		454		1124	
Wolfeel	-		-		-	
Big skate	-		-		-	
Longnose skate	-		-		-	
Sandpaper skate	-		-		-	
Spiny dogfish	1		24		7	
Spotted ratfish	11		139		165	
Invertebrates	-		TRACE		-	
TOTAL CATCH (KG.)	465		995		1719	
REMARKS	USABLE		USABLE		USABLE	

Appendix 2. (cont'd)

HAUL NO.	61		62		63	
BLOCK	C301		C303		C201	
DATE (1998)	JUNE 13		JUNE 13		JUNE 13	
DURATION (H)	0.50		0.50		0.50	
DIRECTION (DEG. TRUE)	195		348		614	
	START	STOP	START	STOP	START	STOP
TIME (PDT)	12:25	12:55	13:42	14:12	15:12	15:42
LAT.(DEG,MIN)	54 05.2	54 03.8	54 07.4	54 08.7	54 07	54 08
LONG.(DEG,MIN)	131 06.9	131 07.2	131 04.3	131 04.6	131 15.1	131 13.7
DEPTH (FA)	15	15	35	35	15	16
SPECIES CATCH(KG.)						
Arrowtooth flounder	-		76		-	
Butter sole	-		1		-	
C-O sole	-		-		-	
Curlfin sole	-		-		-	
Dover sole	-		15		-	
English sole	7		833		6	
Flatfish	-		-		-	
Flathead sole	-		TRACE		-	
Pacific halibut	77		10		-	
Pacific sanddab	TRACE		5		-	
Petrale sole	-		1		-	
Rex sole	-		96		-	
Rock sole (s.)	44		TRACE		36	
Rock sole (n.)	5		1		2	
Sand sole	2		1		-	
Speckled sanddab	1		TRACE		1	
Starry flounder	-		-		-	
Slender sole	-		-		-	
Black rockfish	-		-		-	
Bocaccio	-		-		-	
Canary rockfish	-		-		-	
Copper rockfish	-		-		-	
Darkblotched rockfish	-		-		-	
Greenstriped rockfish	-		-		-	
Harlequin rockfish	-		-		-	
Pacific ocean perch	-		-		-	
Pygmy rockfish	-		-		-	
Quillback rockfish	-		-		-	
Redstripe rockfish	-		-		-	
Silvergray rockfish	-		-		-	
Yelloweye rockfish	-		-		-	
Yellowtail rockfish	-		-		-	
Eelpouts	-		-		-	
Eulachon	-		TRACE		-	
Greenlings	-		-		-	
Lingcod	-		2		-	
Misc. species	-		-		TRACE	
Pacific cod	-		45		-	
Pacific hake	-		-		-	
Pacific herring	8		TRACE		1	
Pacific sardine	-		-		-	
Pacific tomcod	-		75		-	
Poachers	TRACE		TRACE		-	
Red irish lord	-		-		-	
Sablefish	-		2		-	
Salmon	-		9		-	
Sandlance	TRACE		-		-	
Sculpins	-		-		TRACE	
Shiner perch	-		TRACE		-	
Walleye pollock	21		3		-	
Wolfeel	-		-		-	
Big skate	78		-		15	
Longnose skate	-		-		-	
Sandpaper skate	-		-		-	
Spiny dogfish	-		3		22	
Spotted ratfish	41		64		4	
Invertebrates	35		16		6	
TOTAL CATCH (KG.)	319		1258		93	
REMARKS	USABLE		USABLE		USABLE	

Appendix 2. (cont'd)

HAUL NO.	64		65		66	
BLOCK	B301		B302		B305	
DATE (1998)	JUNE 13		JUNE 13		JUNE 14	
DURATION (H)	0.50		0.67		0.50	
DIRECTION (DEG. TRUE)	350		350		10	
	START	STOP	START	STOP	START	STOP
TIME (PDT)	16:24	16:54	17:48	18:28	7:25	7:55
LAT.(DEG,MIN)	54 11.9	54 13.2	54 17.5	54 17.7	54 14.5	54 15.9
LONG.(DEG,MIN)	131 10.1	131 10.6	131 06.3	131 09.1	131 03	131 03.3
DEPTH (FA)	16	13	29	29	55	55
SPECIES CATCH(KG.)						
Arrowtooth flounder	-		29		69	
Butter sole	-		TRACE		-	
C-O sole	-		-		-	
Curlfin sole	-		-		-	
Dover sole	-		-		68	
English sole	TRACE		-		41	
Flatfish	-		-		-	
Flathead sole	-		-		5	
Pacific halibut	21		17		4	
Pacific sanddab	-		-		-	
Petrale sole	-		-		-	
Rex sole	-		-		183	
Rock sole (s.)	27		TRACE		TRACE	
Rock sole (n.)	-		-		-	
Sand sole	4		-		-	
Speckled sanddab	TRACE		-		-	
Starry flounder	5		-		-	
Slender sole	-		-		-	
Black rockfish	-		-		-	
Bocaccio	-		-		-	
Canary rockfish	-		-		-	
Copper rockfish	-		-		-	
Darkblotched rockfish	-		-		-	
Greenstriped rockfish	-		-		-	
Harlequin rockfish	-		-		-	
Pacific ocean perch	-		-		-	
Pygmy rockfish	-		-		-	
Quillback rockfish	-		-		-	
Redstripe rockfish	-		-		-	
Silvergray rockfish	-		-		-	
Yelloweye rockfish	-		-		-	
Yellowtail rockfish	-		-		-	
Eelpouts	-		-		-	
Eulachon	-		-		TRACE	
Greenlings	-		-		-	
Lingcod	-		-		8	
Misc. species	-		-		-	
Pacific cod	89		-		11	
Pacific hake	-		-		-	
Pacific herring	27		99		-	
Pacific sardine	-		-		-	
Pacific tomcod	-		-		TRACE	
Poachers	TRACE		-		-	
Red irish lord	-		-		-	
Sablefish	-		-		-	
Salmon	-		5		-	
Sandlance	28		-		-	
Sculpins	TRACE		-		-	
Shiner perch	-		-		-	
Walleye pollock	-		-		2	
Wolfeel	-		-		-	
Big skate	27		33		66	
Longnose skate	-		-		-	
Sandpaper skate	-		-		-	
Spiny dogfish	-		-		6	
Spotted ratfish	140		2		303	
Invertebrates	1		-		TRACE	
TOTAL CATCH (KG.)	369		185		766	
REMARKS	USABLE		USABLE		USABLE	

Appendix 2. (cont'd)

HAUL NO.	67		68		69	
BLOCK	B304		B303		A304	
DATE (1998)	JUNE 14		JUNE 14		JUNE 14	
DURATION (H)	0.33		0.33		0.33	
DIRECTION (DEG. TRUE)	340		324		336	
	START	STOP	START	STOP	START	STOP
TIME (PDT)	8:46	9:06	9:35	9:55	10:24	10:44
LAT.(DEG,MIN)	54 16.3	54 17.1	54 19.1	54 20.1	54 21.7	54 22.8
LONG.(DEG,MIN)	131 02.8	131 04.7	131 07.1	131 07.8	131 08.7	131 09
DEPTH (FA)	45	43	38	38	39	41
SPECIES CATCH(KG.)						
Arrowtooth flounder	124		25		60	
Butter sole	4		TRACE		-	
C-O sole	-		-		-	
Curlfin sole	-		-		-	
Dover sole	9		7		10	
English sole	107		106		21	
Flatfish	-		-		-	
Flathead sole	2		5		TRACE	
Pacific halibut	11		4		9	
Pacific sanddab	-		-		-	
Petrale sole	-		1		-	
Rex sole	38		30		7	
Rock sole (s.)	-		-		-	
Rock sole (n.)	-		-		-	
Sand sole	-		-		-	
Speckled sanddab	-		-		-	
Starry flounder	-		-		-	
Slender sole	-		-		-	
Black rockfish	-		-		1	
Bocaccio	-		-		-	
Canary rockfish	-		-		-	
Copper rockfish	-		-		-	
Darkblotched rockfish	-		-		-	
Greenstriped rockfish	-		-		-	
Harlequin rockfish	-		-		-	
Pacific ocean perch	-		-		-	
Pygmy rockfish	-		-		-	
Quillback rockfish	-		-		-	
Redstripe rockfish	-		-		-	
Silvergray rockfish	-		-		-	
Yelloweye rockfish	-		-		-	
Yellowtail rockfish	-		-		-	
Eelpouts	-		-		-	
Eulachon	21		TRACE		-	
Greenlings	-		-		-	
Lingcod	-		2		4	
Misc. species	-		-		-	
Pacific cod	16		3		16	
Pacific hake	-		-		-	
Pacific herring	-		-		-	
Pacific sardine	-		-		-	
Pacific tomcod	2		9		16	
Poachers	-		-		-	
Red irish lord	-		-		-	
Sablefish	-		2		-	
Salmon	-		-		4	
Sandlance	TRACE		TRACE		TRACE	
Sculpins	-		-		-	
Shiner perch	-		-		-	
Walleye pollock	9		1		5	
Wolfeel	-		-		-	
Big skate	-		-		-	
Longnose skate	3		-		-	
Sandpaper skate	2		-		-	
Spiny dogfish	11		-		5	
Spotted ratfish	74		21		93	
Invertebrates	14		16		18	
TOTAL CATCH (KG.)	447		232		269	
REMARKS	USABLE		USABLE		USABLE	

Appendix 2. (cont'd)

HAUL NO.	70		71		72	
BLOCK	A306		A307		A207	
DATE (1998)	JUNE 14		JUNE 14		JUNE 14	
DURATION (H)	0.50		0.50		0.48	
DIRECTION (DEG. TRUE)	256		315		270	
	START	STOP	START	STOP	START	STOP
TIME (PDT)	11:21	11:51	12:41	13:11	14:06	14:35
LAT.(DEG,MIN)	54 25.7	54 25.5	54 27.9	54 29.2	54 26.6	54 26.6
LONG.(DEG,MIN)	131 09.2	131 11.3	131 08.1	131 08.8	131 12.6	131 14.7
DEPTH (FA)	67	75	72	72	74	77

SPECIES CATCH(KG.)

Arrowtooth flounder	81	75	290
Butter sole	-	-	-
C-O sole	-	-	-
Curlfin sole	-	-	-
Dover sole	112	12	284
English sole	34	1	TRACE
Flatfish	-	-	-
Flathead sole	TRACE	20	59
Pacific halibut	4	11	-
Pacific sanddab	-	-	-
Petrale sole	-	-	-
Rex sole	12	25	32
Rock sole (s.)	-	-	-
Rock sole (n.)	-	-	-
Sand sole	-	-	-
Speckled sanddab	-	-	-
Starry flounder	-	-	-
Slender sole	-	-	-
Black rockfish	-	-	-
Bocaccio	-	-	-
Canary rockfish	-	-	-
Copper rockfish	-	-	-
Darkblotched rockfish	-	-	-
Greenstriped rockfish	-	-	-
Harlequin rockfish	-	-	-
Pacific ocean perch	2	-	TRACE
Pygmy rockfish	-	-	-
Quillback rockfish	-	-	-
Redstripe rockfish	-	-	-
Silvergray rockfish	-	-	-
Yelloweye rockfish	-	-	-
Yellowtail rockfish	-	4	1
Eelpouts	-	1	TRACE
Eulachon	-	36	-
Greenlings	-	-	-
Lingcod	-	-	1
Misc. species	-	-	-
Pacific cod	14	4	8
Pacific hake	-	-	-
Pacific herring	-	-	-
Pacific sardine	-	-	-
Pacific tomcod	-	-	-
Poachers	-	-	-
Red irish lord	-	-	-
Sablefish	17	20	89
Salmon	-	-	-
Sandlance	-	-	TRACE
Sculpins	-	-	-
Shiner perch	-	-	-
Walleye pollock	62	2	4
Wolfeel	-	-	-
Big skate	-	-	40
Longnose skate	-	2	10
Sandpaper skate	-	-	-
Spiny dogfish	95	10	31
Spotted ratfish	187	18	1
Invertebrates	TRACE	6	8
TOTAL CATCH (KG.)	620	247	858
REMARKS	USABLE	USABLE	USABLE

Appendix 2. (cont'd)

HAUL NO.	73		74		75	
BLOCK	A206		A205		A204	
DATE (1998)	JUNE 14		JUNE 14		JUNE 14	
DURATION (H)	0.50		0.50		0.50	
DIRECTION (DEG. TRUE)	232		200		353	
	START	STOP	START	STOP	START	STOP
TIME (PDT)	15:21	15:51	16:16	16:46	17:17	17:47
LAT.(DEG,MIN)	54 23.7	54 22.1	54 21.6	54 20.3	54 19.8	54 21.2
LONG.(DEG,MIN)	131 15.8	131 16.7	131 15.4	131 15.6	131 15	131 12.8
DEPTH (FA)	66	66	53	54	40	40
SPECIES CATCH(KG.)						
Arrowtooth flounder	604		783		537	
Butter sole	-		1		4	
C-O sole	-		-		-	
Curlfin sole	-		-		-	
Dover sole	5		3		1	
English sole	-		-		144	
Flatfish	-		-		-	
Flathead sole	TRACE		1		-	
Pacific halibut	-		18		58	
Pacific sanddab	-		-		-	
Petrale sole	-		-		2	
Rex sole	5		-		10	
Rock sole (s.)	-		-		-	
Rock sole (n.)	-		-		-	
Sand sole	-		-		-	
Speckled sanddab	-		-		-	
Starry flounder	-		-		-	
Slender sole	-		-		-	
Black rockfish	-		-		-	
Bocaccio	-		-		-	
Canary rockfish	-		-		-	
Copper rockfish	-		-		-	
Darkblotched rockfish	-		-		-	
Greenstriped rockfish	-		-		-	
Harlequin rockfish	-		-		-	
Pacific ocean perch	-		-		-	
Pygmy rockfish	-		-		-	
Quillback rockfish	-		-		-	
Redstripe rockfish	-		-		-	
Silvergray rockfish	-		-		-	
Yelloweye rockfish	-		-		-	
Yellowtail rockfish	-		40		-	
Eelpouts	TRACE		-		-	
Eulachon	-		-		-	
Greenlings	-		-		-	
Lingcod	8		-		-	
Misc. species	-		-		-	
Pacific cod	-		10		10	
Pacific hake	-		-		-	
Pacific herring	-		-		-	
Pacific sardine	-		-		-	
Pacific tomcod	-		-		-	
Poachers	-		-		-	
Red irish lord	-		-		-	
Sablefish	21		10		-	
Salmon	-		-		-	
Sandlance	-		-		-	
Sculpins	-		-		-	
Shiner perch	-		-		-	
Walleye pollock	TRACE		119		-	
Wolfeel	-		-		-	
Big skate	-		-		-	
Longnose skate	-		-		-	
Sandpaper skate	-		-		-	
Spiny dogfish	89		99		5	
Spotted ratfish	79		120		297	
Invertebrates	-		-		TRACE	
TOTAL CATCH (KG.)	811		1204		1068	
REMARKS	USABLE		USABLE		USABLE	

Appendix 2. (cont'd)

HAUL NO.	76		77		78	
BLOCK	B202		B104		B105	
DATE (1998)	JUNE 15		JUNE 15		JUNE 15	
DURATION (H)	0.50		0.50		0.50	
DIRECTION (DEG. TRUE)	260		228		248	
	START	STOP	START	STOP	START	STOP
TIME (PDT)	6:10	6:40	7:09	7:39	8:13	8:43
LAT.(DEG,MIN)	54 16.5	54 16.1	54 16.6	54 16	54 15.3	54 14.9
LONG.(DEG,MIN)	131 26	131 28.2	131 30	131 32.2	131 35.8	131 38
DEPTH (FA)	25	24	43	44	55	54
SPECIES CATCH(KG.)						
Arrowtooth flounder	39		569		616	
Butter sole	84		-		-	
C-O sole	-		-		-	
Curlfin sole	-		-		-	
Dover sole	-		164		479	
English sole	64		212		156	
Flatfish	-		-		-	
Flathead sole	-		-		-	
Pacific halibut	25		96		-	
Pacific sanddab	-		-		-	
Petrale sole	-		-		13	
Rex sole	-		231		123	
Rock sole (s.)	-		-		-	
Rock sole (n.)	-		-		-	
Sand sole	-		-		-	
Speckled sanddab	-		-		-	
Starry flounder	-		-		-	
Slender sole	-		-		-	
Black rockfish	-		-		-	
Bocaccio	-		-		-	
Canary rockfish	-		-		-	
Copper rockfish	-		-		-	
Darkblotched rockfish	-		-		-	
Greenstriped rockfish	-		-		-	
Harlequin rockfish	-		-		-	
Pacific ocean perch	-		-		-	
Pygmy rockfish	-		-		-	
Quillback rockfish	-		-		-	
Redstripe rockfish	-		-		-	
Silvergray rockfish	-		-		-	
Yelloweye rockfish	-		-		-	
Yellowtail rockfish	-		-		-	
Eelpouts	-		-		-	
Eulachon	-		-		-	
Greenlings	-		-		-	
Lingcod	-		20		13	
Misc. species	-		-		-	
Pacific cod	25		29		6	
Pacific hake	-		-		-	
Pacific herring	-		-		-	
Pacific sardine	-		-		-	
Pacific tomcod	-		-		-	
Poachers	-		-		-	
Red irish lord	-		-		-	
Sablefish	-		TRACE		58	
Salmon	-		-		-	
Sandlance	-		-		-	
Sculpins	-		-		-	
Shiner perch	-		-		-	
Walleye pollock	-		TRACE		TRACE	
Wolfeel	-		-		-	
Big skate	105		-		-	
Longnose skate	-		-		-	
Sandpaper skate	-		19		-	
Spiny dogfish	21		1715		117	
Spotted ratfish	35		1426		1406	
Invertebrates	-		19		13	
TOTAL CATCH (KG.)	398		4500		3000	
REMARKS	USABLE		USABLE		USABLE	

Appendix 2. (cont'd)

HAUL NO.	79		80		81	
BLOCK	B101		B106		B103	
DATE (1998)	JUNE 15		JUNE 15		JUNE 15	
DURATION (H)	0.50		0.50		0.40	
DIRECTION (DEG. TRUE)	0		55		182	
	START	STOP	START	STOP	START	STOP
TIME (PDT)	9:40	10:10	11:00	11:30	12:43	13:07
LAT.(DEG,MIN)	54 10.5	54 09.6	54 13.9	54 14.8	54 16	54 16.5
LONG.(DEG,MIN)	131 44.6	131 46.3	131 43.4	131 41.9	131 31.6	131 29.4
DEPTH (FA)	19	17	64	64	34	32
SPECIES CATCH(KG.)						
Arrowtooth flounder	127		124		37	
Butter sole	5		-		1	
C-O sole	-		-		-	
Curlfin sole	-		-		-	
Dover sole	TRACE		58		1	
English sole	403		-		65	
Flatfish	432		-		-	
Flathead sole	-		1		-	
Pacific halibut	167		11		-	
Pacific sanddab	-		-		-	
Petrale sole	26		-		-	
Rex sole	3		29		TRACE	
Rock sole (s.)	TRACE		-		-	
Rock sole (n.)	-		-		-	
Sand sole	-		-		-	
Speckled sanddab	-		-		-	
Starry flounder	-		-		-	
Slender sole	-		-		-	
Black rockfish	-		-		-	
Bocaccio	-		-		-	
Canary rockfish	-		-		-	
Copper rockfish	-		-		-	
Darkblotched rockfish	-		1		-	
Greenstriped rockfish	-		-		-	
Harlequin rockfish	-		-		-	
Pacific ocean perch	-		26		-	
Pygmy rockfish	-		TRACE		-	
Quillback rockfish	-		-		-	
Redstripe rockfish	-		-		-	
Silvergray rockfish	-		19		-	
Yelloweye rockfish	-		1		-	
Yellowtail rockfish	-		-		-	
Eelpouts	-		TRACE		-	
Eulachon	-		-		-	
Greenlings	-		-		-	
Lingcod	-		-		31	
Misc. species	-		-		-	
Pacific cod	203		1		5	
Pacific hake	-		-		-	
Pacific herring	169		TRACE		-	
Pacific sardine	-		-		-	
Pacific tomcod	34		-		-	
Poachers	-		-		-	
Red irish lord	-		-		-	
Sablefish	-		16		-	
Salmon	-		-		-	
Sandlance	-		-		-	
Sculpins	-		-		-	
Shiner perch	-		-		-	
Walleye pollock	-		18		TRACE	
Wolfeel	-		-		-	
Big skate	-		-		-	
Longnose skate	-		-		-	
Sandpaper skate	-		-		-	
Spiny dogfish	1046		15		8	
Spotted ratfish	385		32		34	
Invertebrates	-		-		-	
TOTAL CATCH (KG.)	3000		352		182	
REMARKS	USABLE		USABLE		USABLE	

Appendix 2. (cont'd)

HAUL NO.	82		83		84	
BLOCK	B204		B203		A203	
DATE (1998)	JUNE 15		JUNE 15		JUNE 15	
DURATION (H)	0.50		0.27		0.50	
DIRECTION (DEG. TRUE)	52		82		354	
	START	STOP	START	STOP	START	STOP
TIME (PDT)	13:52	14:22	14:55	15:11	15:47	16:17
LAT.(DEG,MIN)	54 18	54 18.1	54 18.1	54 17.7	54 20.3	54 21.6
LONG.(DEG,MIN)	131 24.5	131 22	131 15.5	131 14.3	131 12	131 11.7
DEPTH (FA)	44	42	37	37	36	37
SPECIES CATCH(KG.)						
Arrowtooth flounder	3147		9		33	
Butter sole	29		TRACE		1	
C-O sole	-		-		-	
Curlfin sole	-		-		-	
Dover sole	-		3		TRACE	
English sole	589		2		1	
Flatfish	-		-		-	
Flathead sole	-		-		-	
Pacific halibut	-		-		53	
Pacific sanddab	-		-		-	
Petrale sole	-		-		-	
Rex sole	-		-		-	
Rock sole (s.)	-		-		-	
Rock sole (n.)	-		-		-	
Sand sole	-		-		-	
Speckled sanddab	-		-		-	
Starry flounder	-		-		-	
Slender sole	-		-		-	
Black rockfish	-		-		-	
Bocaccio	-		-		-	
Canary rockfish	-		-		-	
Copper rockfish	-		-		-	
Darkblotched rockfish	-		-		-	
Greenstriped rockfish	-		-		-	
Harlequin rockfish	-		-		-	
Pacific ocean perch	-		-		-	
Pygmy rockfish	-		-		-	
Quillback rockfish	-		-		-	
Redstripe rockfish	-		-		-	
Silvergray rockfish	-		-		-	
Yelloweye rockfish	-		-		-	
Yellowtail rockfish	-		-		-	
Eelpouts	TRACE		-		-	
Eulachon	-		-		-	
Greenlings	-		-		-	
Lingcod	-		134		-	
Misc. species	-		-		-	
Pacific cod	485		-		2	
Pacific hake	-		-		-	
Pacific herring	-		21		1	
Pacific sardine	-		-		-	
Pacific tomcod	-		-		-	
Poachers	-		-		-	
Red irish lord	-		-		-	
Sablefish	TRACE		-		-	
Salmon	-		-		-	
Sandlance	-		TRACE		-	
Sculpins	-		-		-	
Shiner perch	-		-		-	
Walleye pollock	-		-		-	
Wolfeel	-		-		-	
Big skate	-		-		11	
Longnose skate	-		-		-	
Sandpaper skate	-		-		-	
Spiny dogfish	-		20		2	
Spotted ratfish	-		TRACE		12	
Invertebrates	-		20		TRACE	
TOTAL CATCH (KG.)	4250		209		116	
REMARKS	USABLE		USABLE		USABLE	

Appendix 2. (cont'd)

HAUL NO.	85		86		87	
BLOCK	B201		B206		B205	
DATE (1998)	JUNE 15		JUNE 16		JUNE 16	
DURATION (H)	0.50		0.50		0.50	
DIRECTION (DEG. TRUE)	286		260		262	
	START	STOP	START	STOP	START	STOP
TIME (PDT)	17:07	17:37	11:19	11:49	12:39	13:09
LAT.(DEG,MIN)	54 17.8	54 17.8	54 19.2	54 18.9	54 18.6	54 18.4
LONG.(DEG,MIN)	131 17.8	131 20.1	131 19	131 21.3	131 21.7	131 24
DEPTH (FA)	19	18	65	66	58	57
SPECIES CATCH(KG.)						
Arrowtooth flounder	TRACE		685		723	
Butter sole	-		-		-	
C-O sole	-		-		-	
Curlfin sole	-		-		-	
Dover sole	-		1335		518	
English sole	-		194		606	
Flatfish	-		-		-	
Flathead sole	-		6		4	
Pacific halibut	-		529		-	
Pacific sanddab	-		-		-	
Petrale sole	-		3		-	
Rex sole	-		465		231	
Rock sole (s.)	-		-		-	
Rock sole (n.)	-		-		-	
Sand sole	4		-		-	
Speckled sanddab	-		-		-	
Starry flounder	5		-		-	
Slender sole	-		-		-	
Black rockfish	-		-		-	
Bocaccio	-		-		-	
Canary rockfish	-		-		-	
Copper rockfish	-		-		-	
Darkblotched rockfish	-		-		-	
Greenstriped rockfish	-		-		-	
Harlequin rockfish	-		-		-	
Pacific ocean perch	-		-		-	
Pygmy rockfish	-		-		-	
Quillback rockfish	-		-		-	
Redstripe rockfish	-		-		-	
Silvergray rockfish	-		-		-	
Yelloweye rockfish	-		-		-	
Yellowtail rockfish	-		-		52	
Eelpouts	-		-		-	
Eulachon	-		-		-	
Greenlings	-		-		-	
Lingcod	-		13		TRACE	
Misc. species	-		-		-	
Pacific cod	-		92		17	
Pacific hake	-		-		-	
Pacific herring	TRACE		-		-	
Pacific sardine	-		-		-	
Pacific tomcod	-		-		TRACE	
Poachers	-		-		-	
Red irish lord	-		-		-	
Sablefish	-		102		222	
Salmon	-		-		-	
Sandlance	5		-		-	
Sculpins	-		-		-	
Shiner perch	-		-		-	
Walleye pollock	-		10		91	
Wolfeel	-		-		-	
Big skate	69		-		-	
Longnose skate	-		-		-	
Sandpaper skate	-		-		-	
Spiny dogfish	8		112		114	
Spotted ratfish	2		950		922	
Invertebrates	TRACE		4		-	
TOTAL CATCH (KG.)	93		4500		3500	
REMARKS	USABLE		USABLE		USABLE	

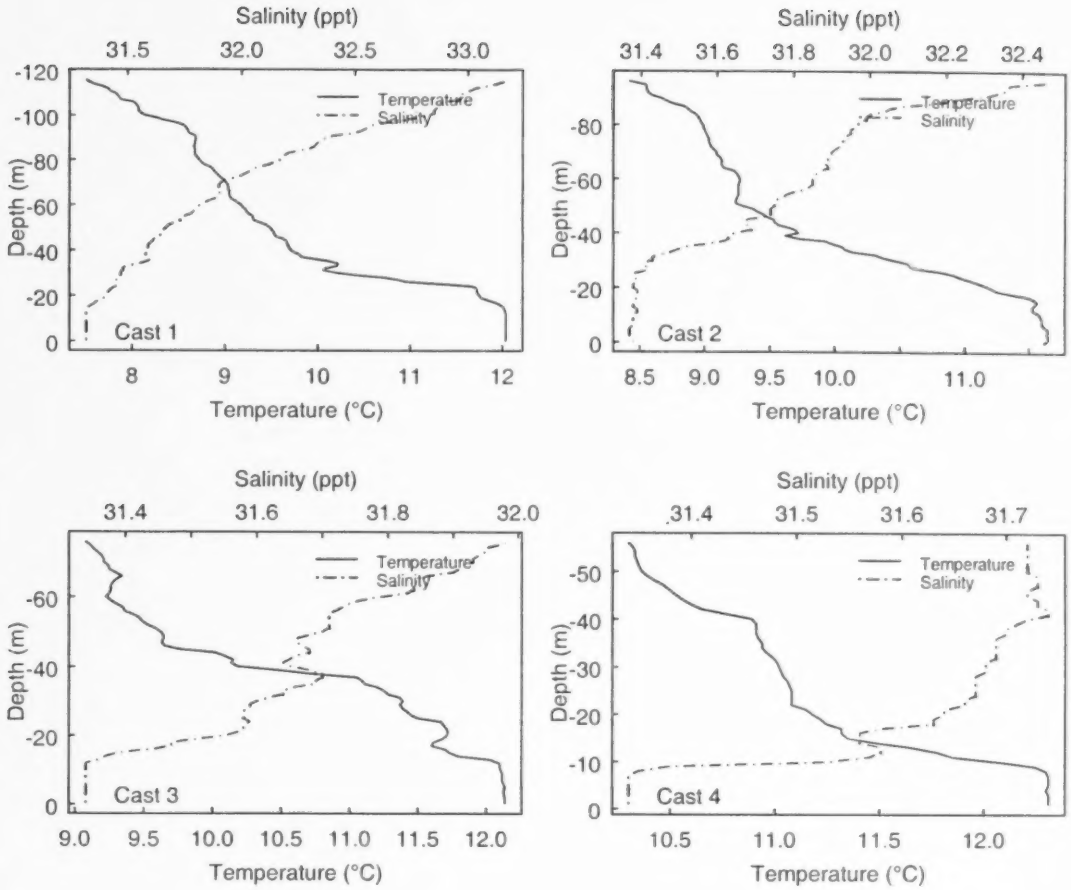
Appendix 2. (cont'd)

HAUL NO.	88
BLOCK	B207
DATE (1998)	JUNE 16
DURATION (H)	0.50
DIRECTION (DEG. TRUE)	269

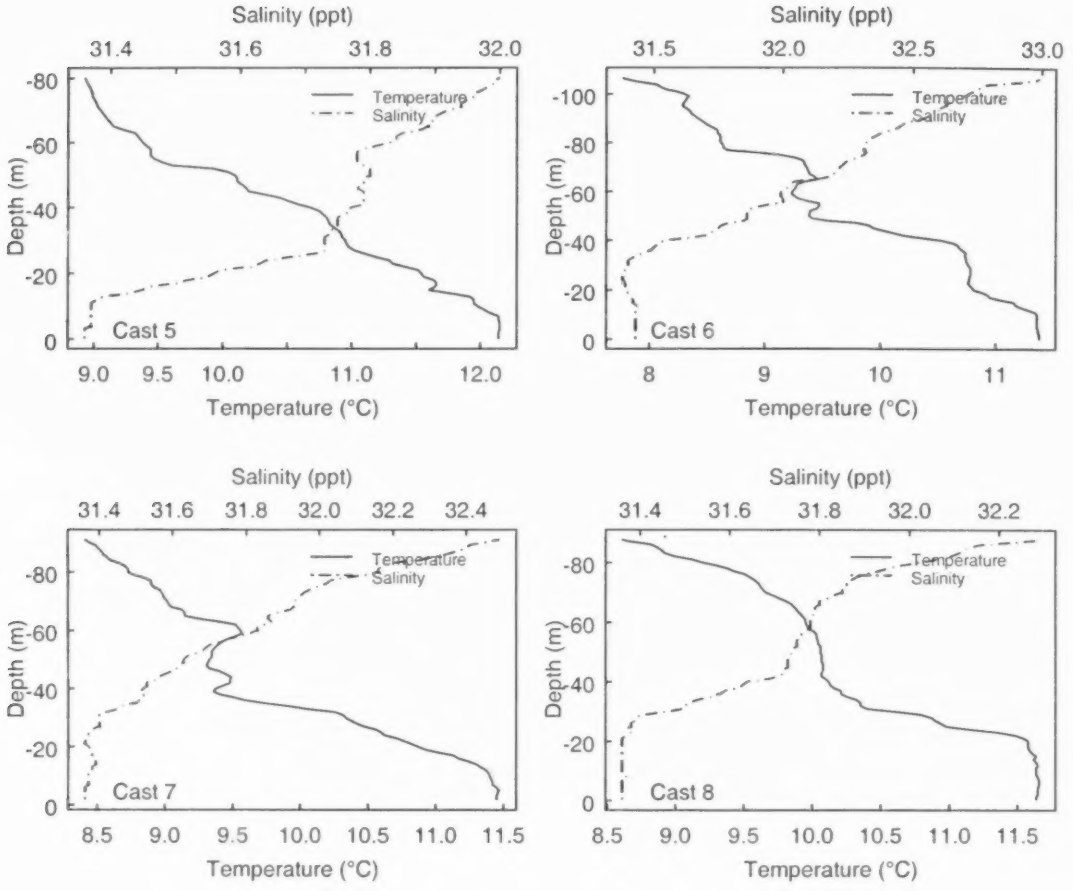
	START	STOP
TIME (PDT)	13:39	14:09
LAT.(DEG,MIN)	54 18.7	54 18.2
LONG.(DEG,MIN)	131 25.2	131 27.4
DEPTH (FA)	70	70

SPECIES CATCH(KG.)

Arrowtooth flounder	96
Butter sole	-
C-O sole	-
Curlfin sole	-
Dover sole	23
English sole	87
Flatfish	-
Flathead sole	1
Pacific halibut	18
Pacific sanddab	-
Petrale sole	-
Rex sole	1
Rock sole (s.)	-
Rock sole (n.)	-
Sand sole	-
Speckled sanddab	-
Starry flounder	-
Slender sole	-
Black rockfish	-
Bocaccio	6
Canary rockfish	-
Copper rockfish	-
Darkblotched rockfish	-
Greenstriped rockfish	-
Harlequin rockfish	-
Pacific ocean perch	13
Pygmy rockfish	-
Quillback rockfish	-
Redstripe rockfish	-
Silvergray rockfish	-
Yelloweye rockfish	-
Yellowtail rockfish	-
Eelpouts	-
Eulachon	-
Greenlings	-
Lingcod	-
Misc. species	-
Pacific cod	7
Pacific hake	-
Pacific herring	-
Pacific sardine	-
Pacific tomcod	TRACE
Poachers	-
Red irish lord	-
Sablefish	28
Salmon	-
Sandlance	-
Sculpins	-
Shiner perch	-
Walleye pollock	69
Wolfeel	-
Big skate	-
Longnose skate	-
Sandpaper skate	-
Spiny dogfish	21
Spotted ratfish	111
Invertebrates	TRACE
TOTAL CATCH (KG.)	481
REMARKS	USABLE



Appendix 3. Temperature and salinity profiles for CTD cast performed during the 1998 Hecate Strait trawl survey on the CCGS W.E. Ricker.



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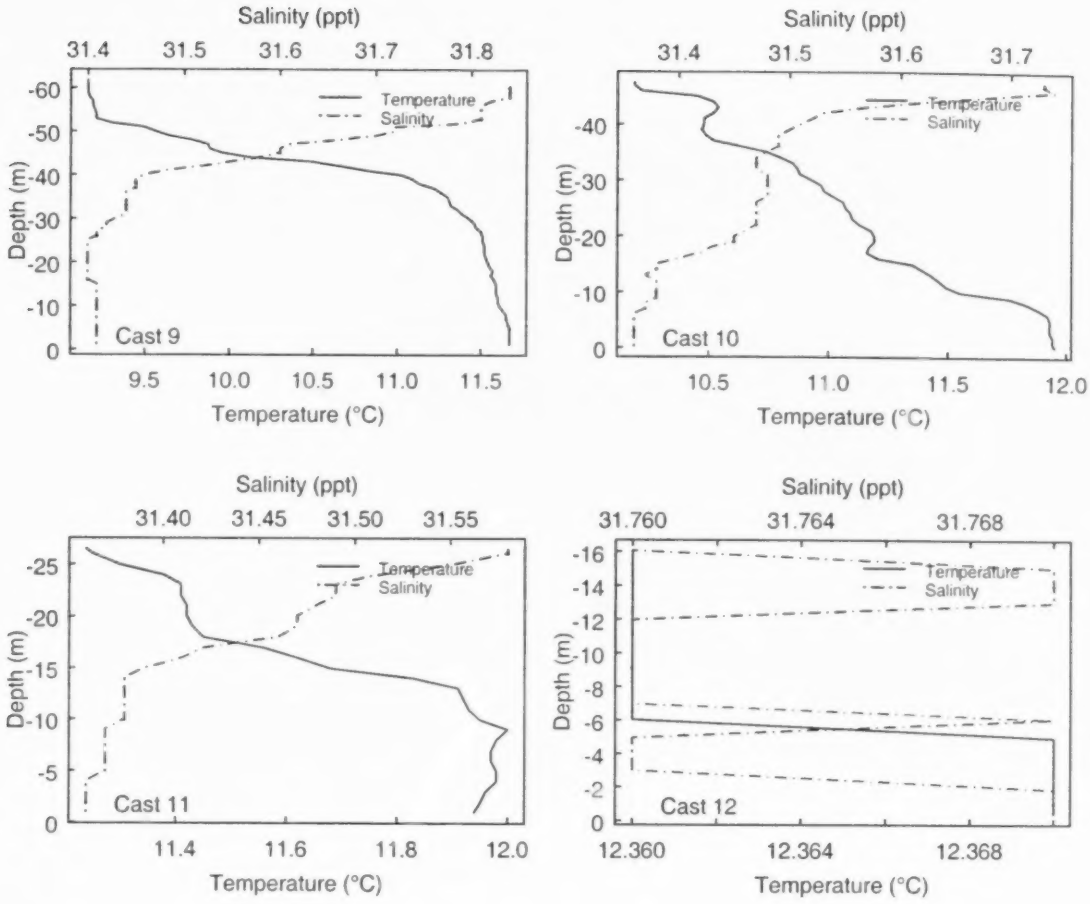

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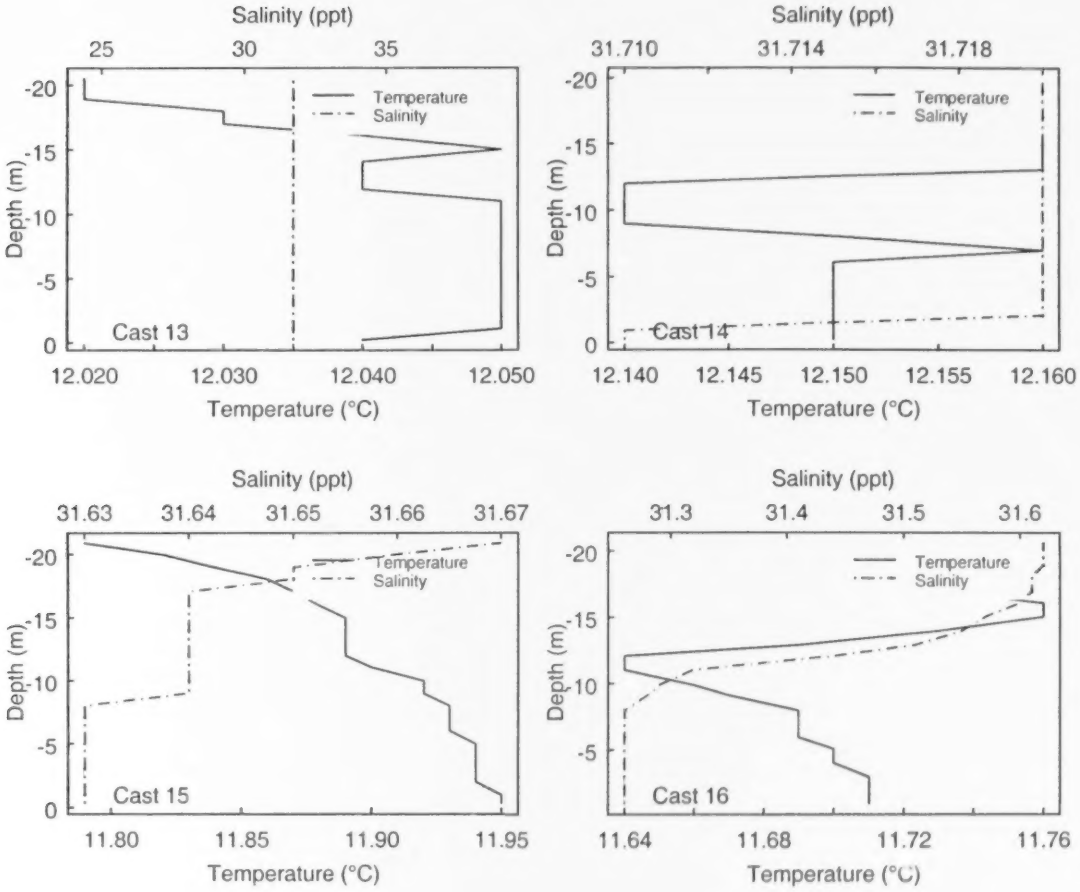

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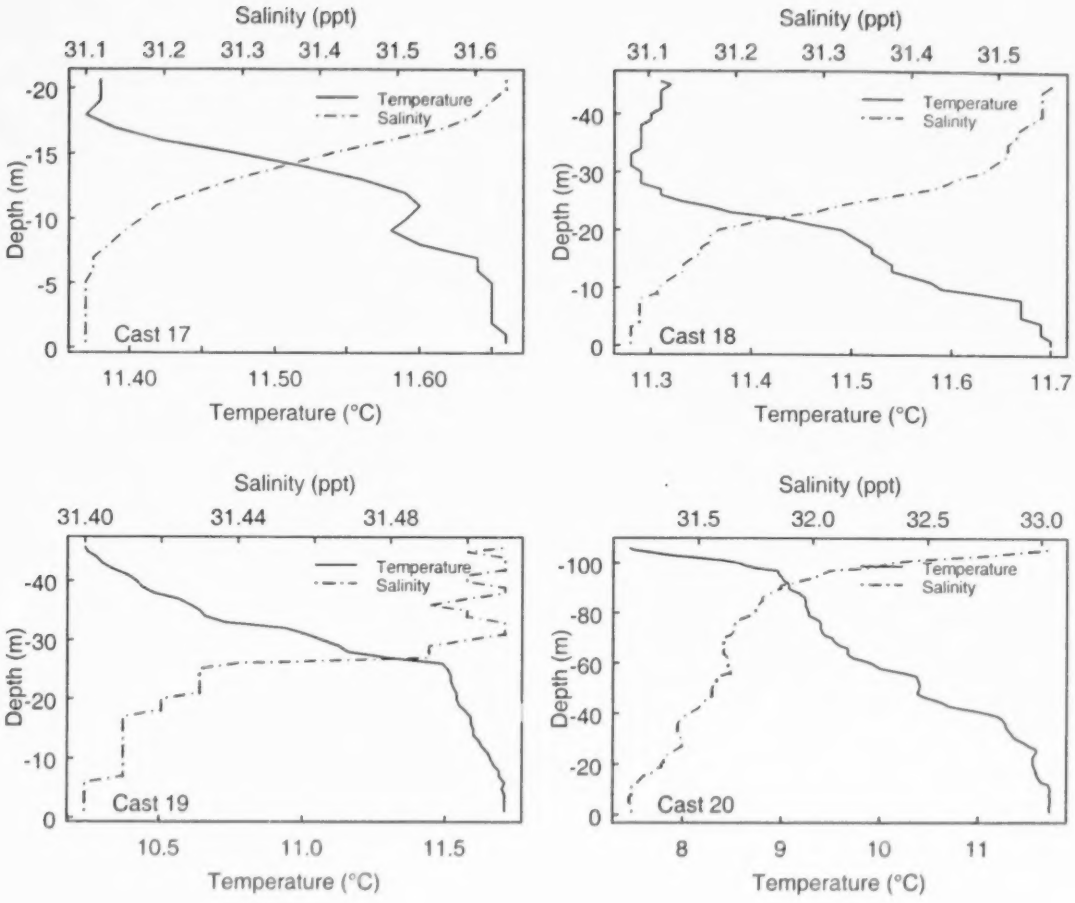

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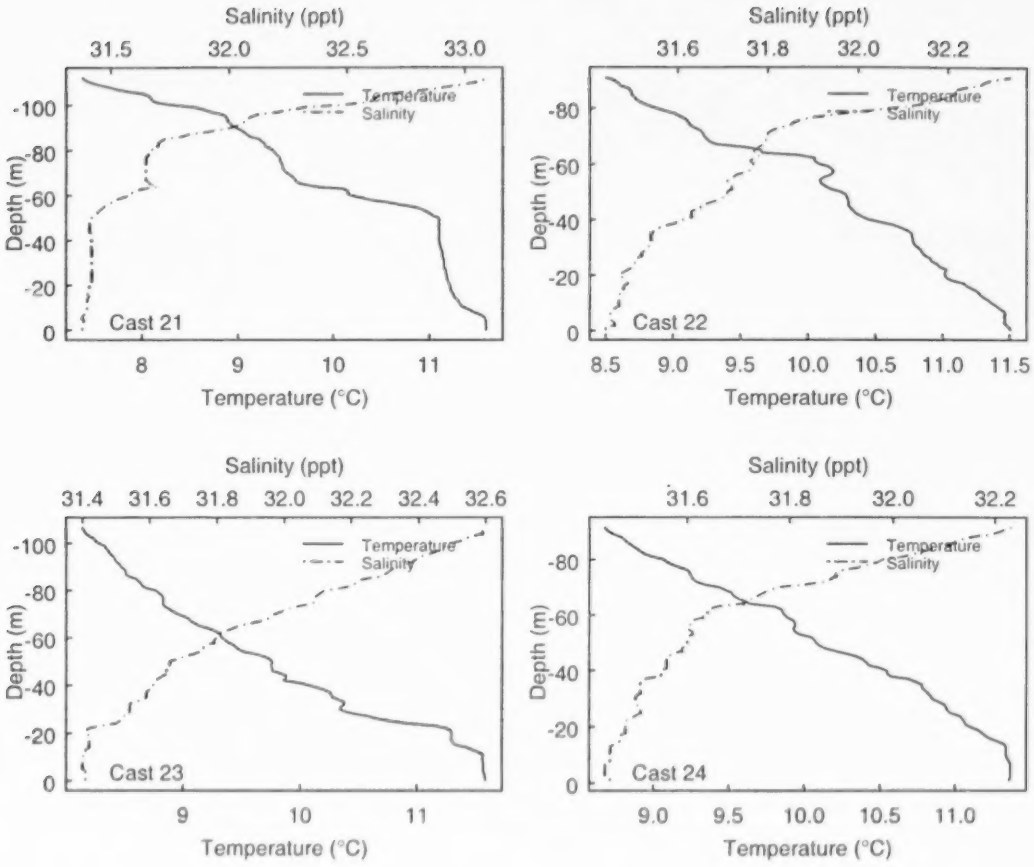

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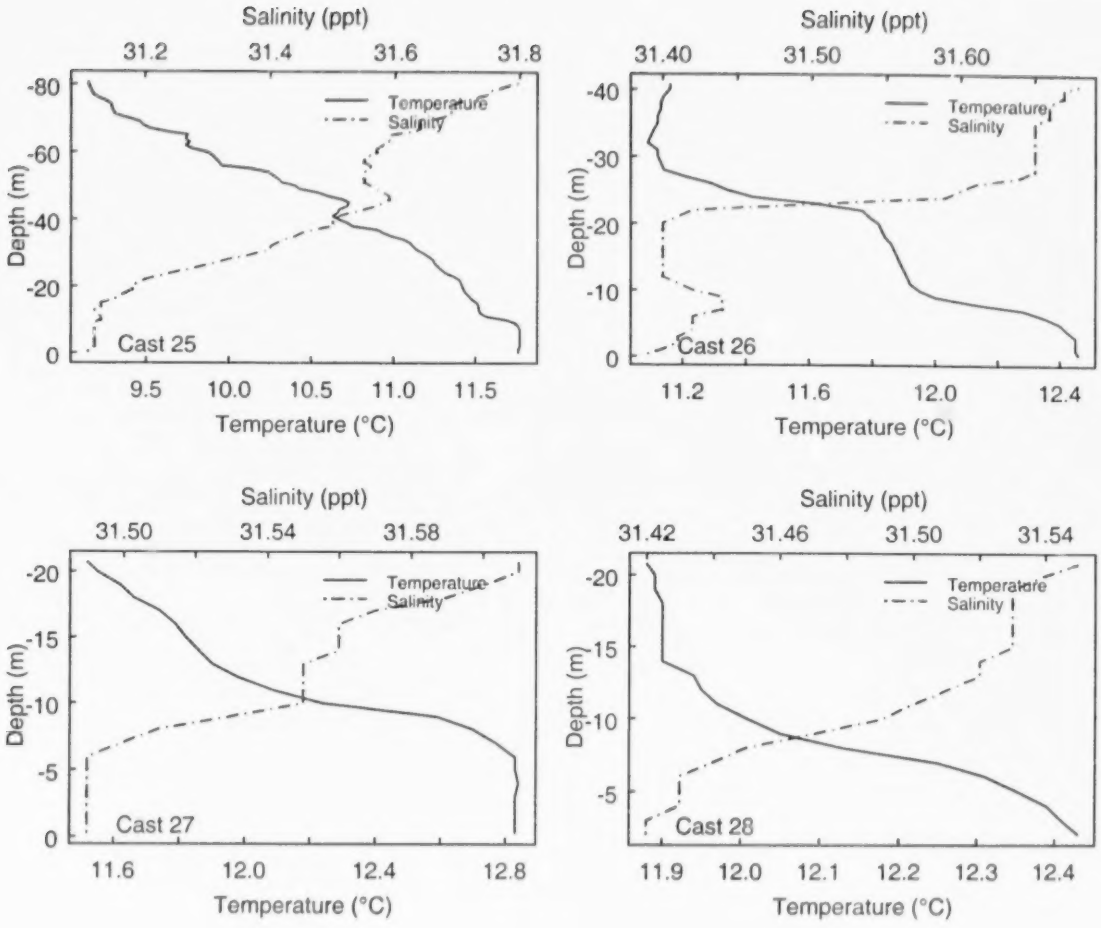

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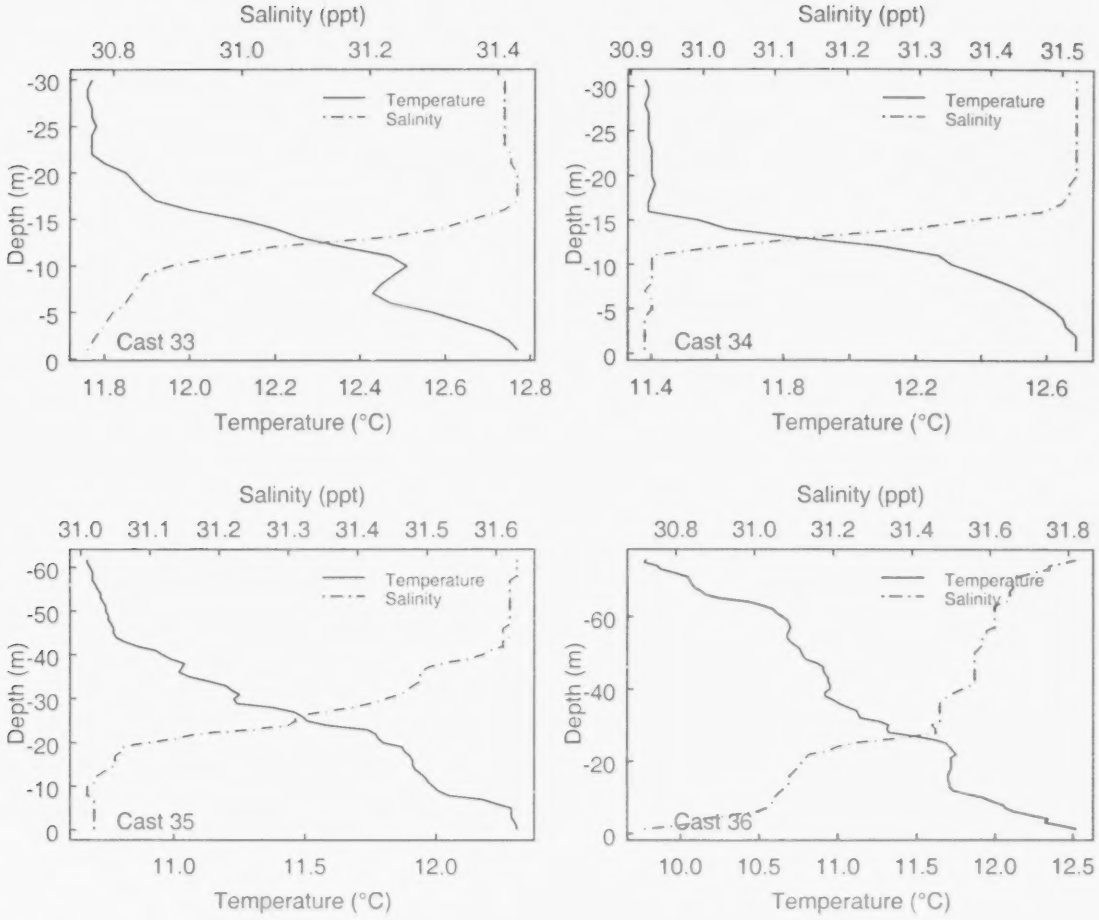

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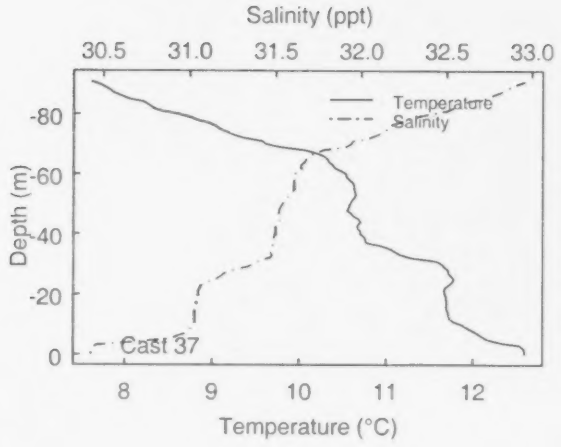

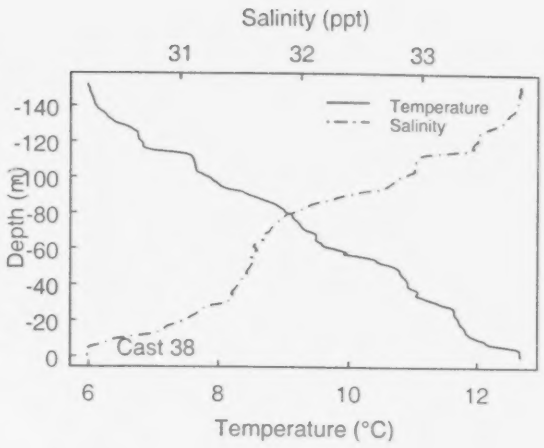

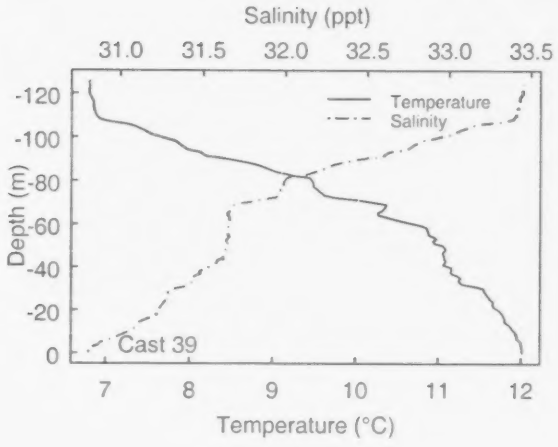

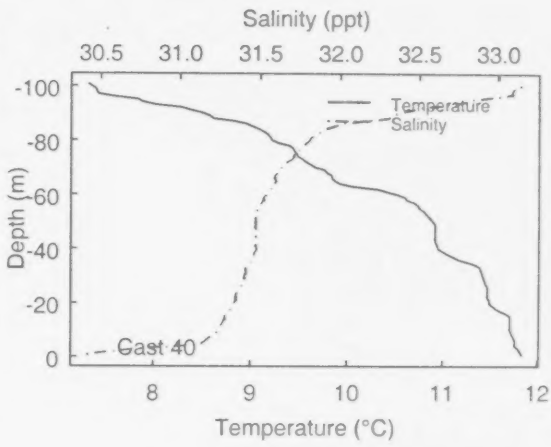

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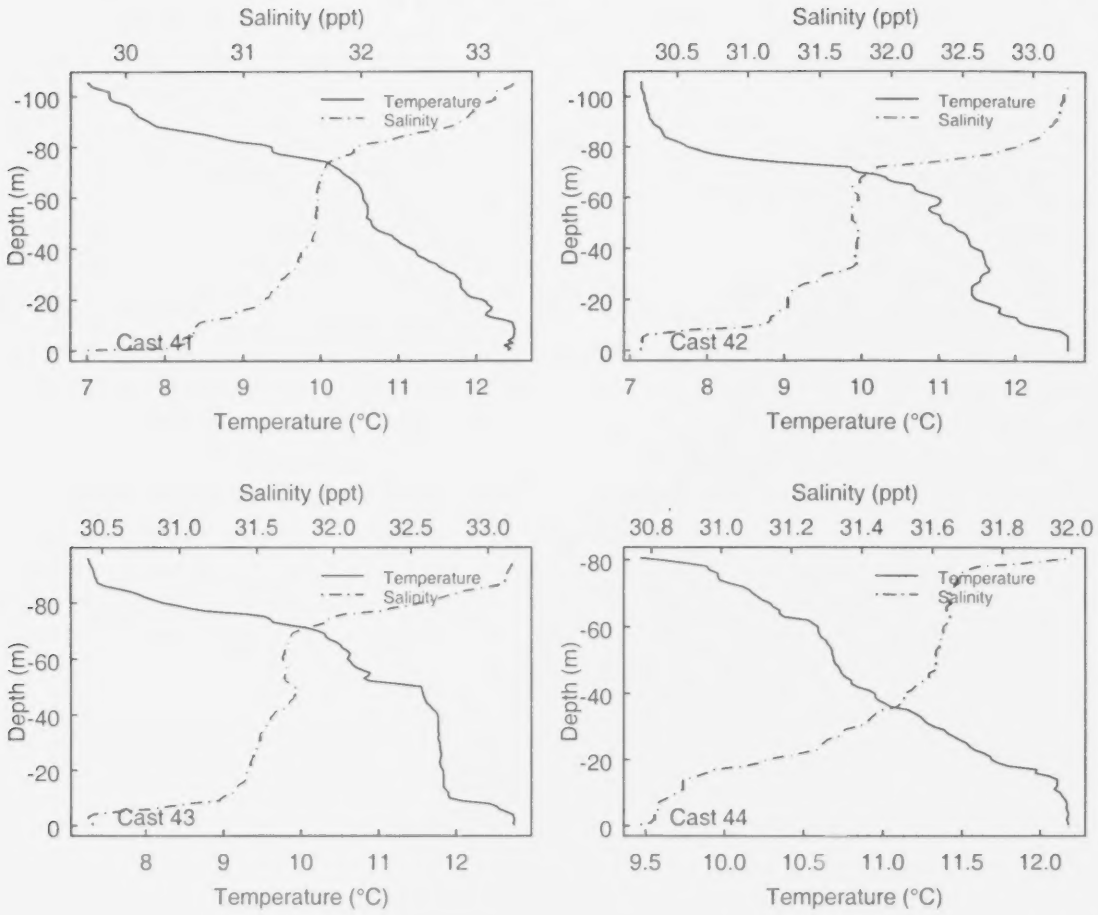

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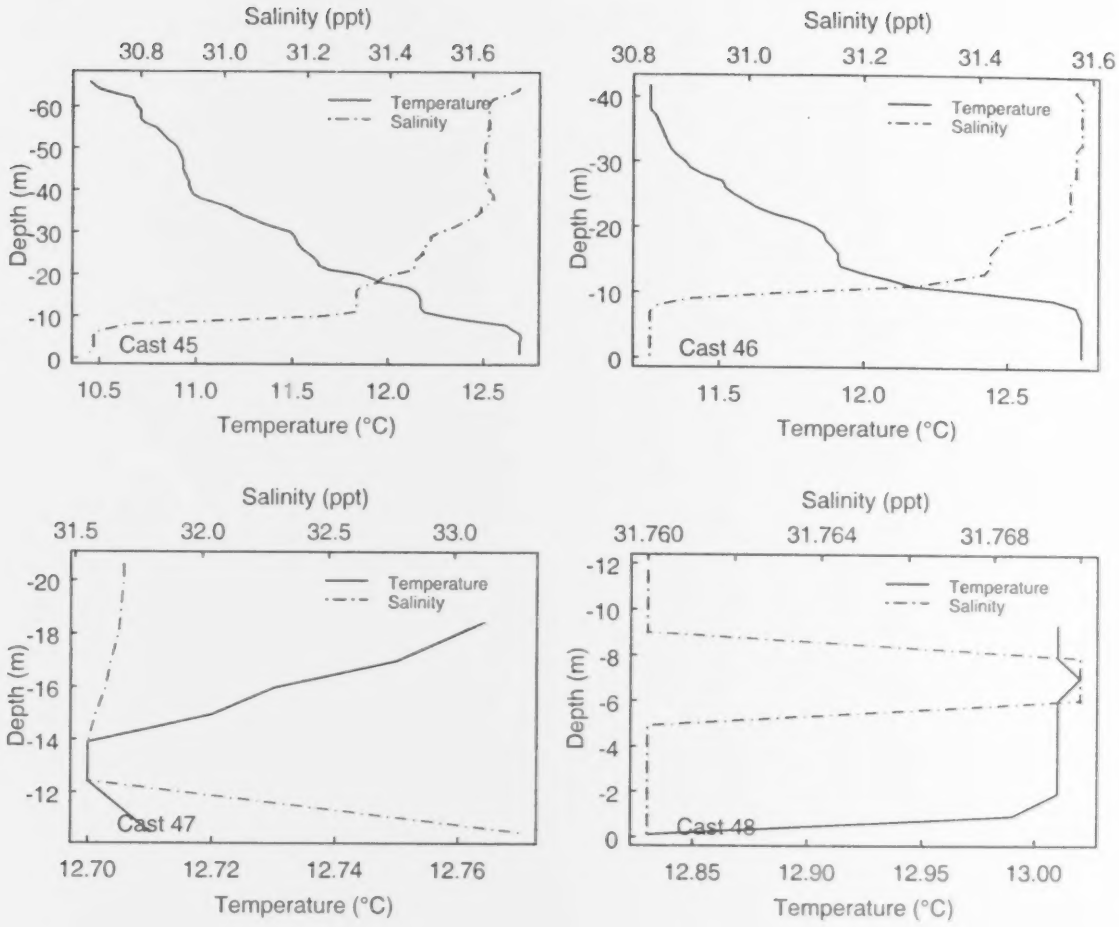

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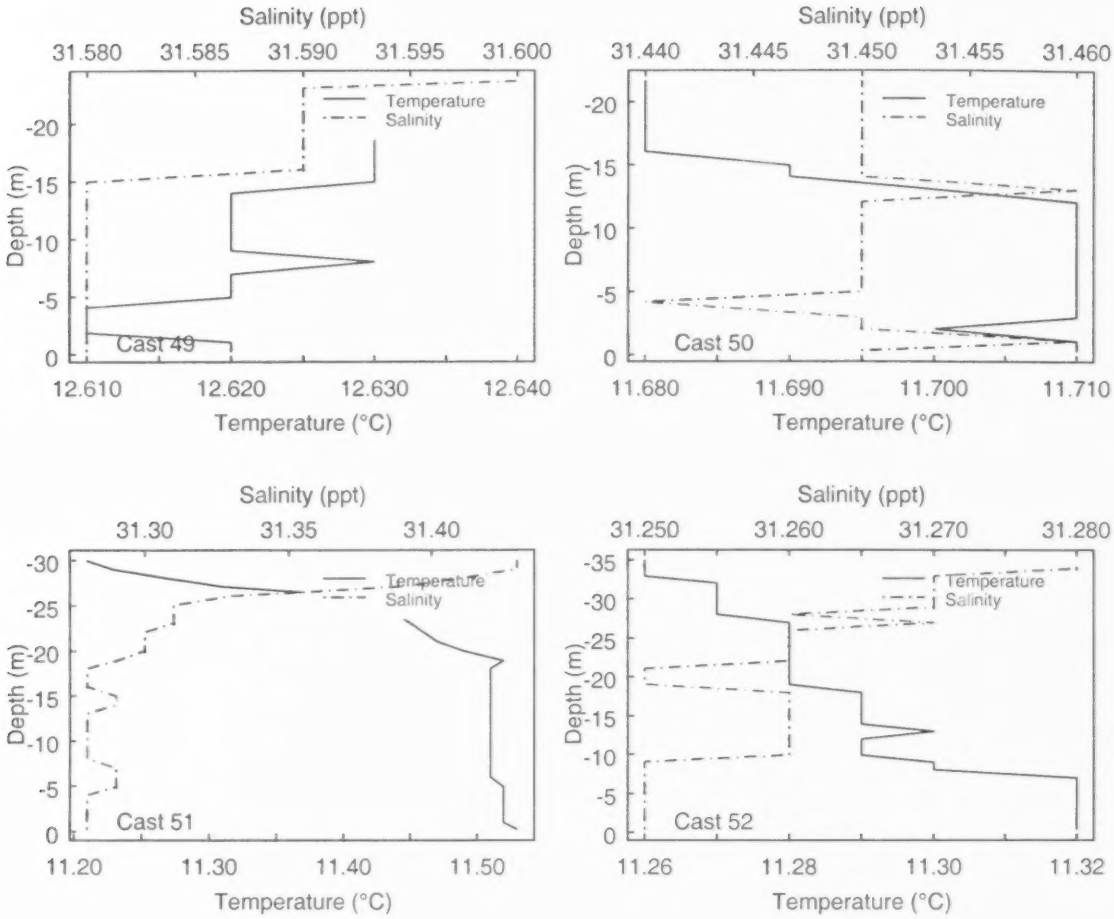

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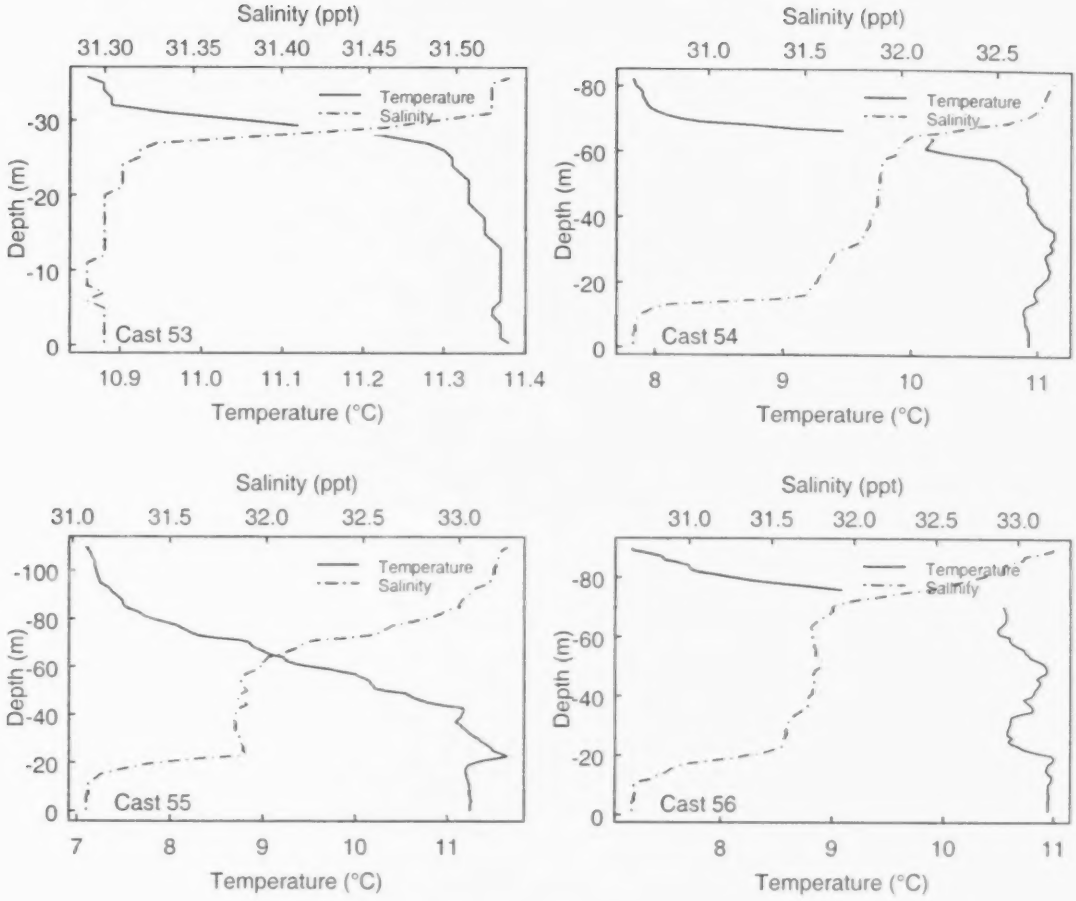

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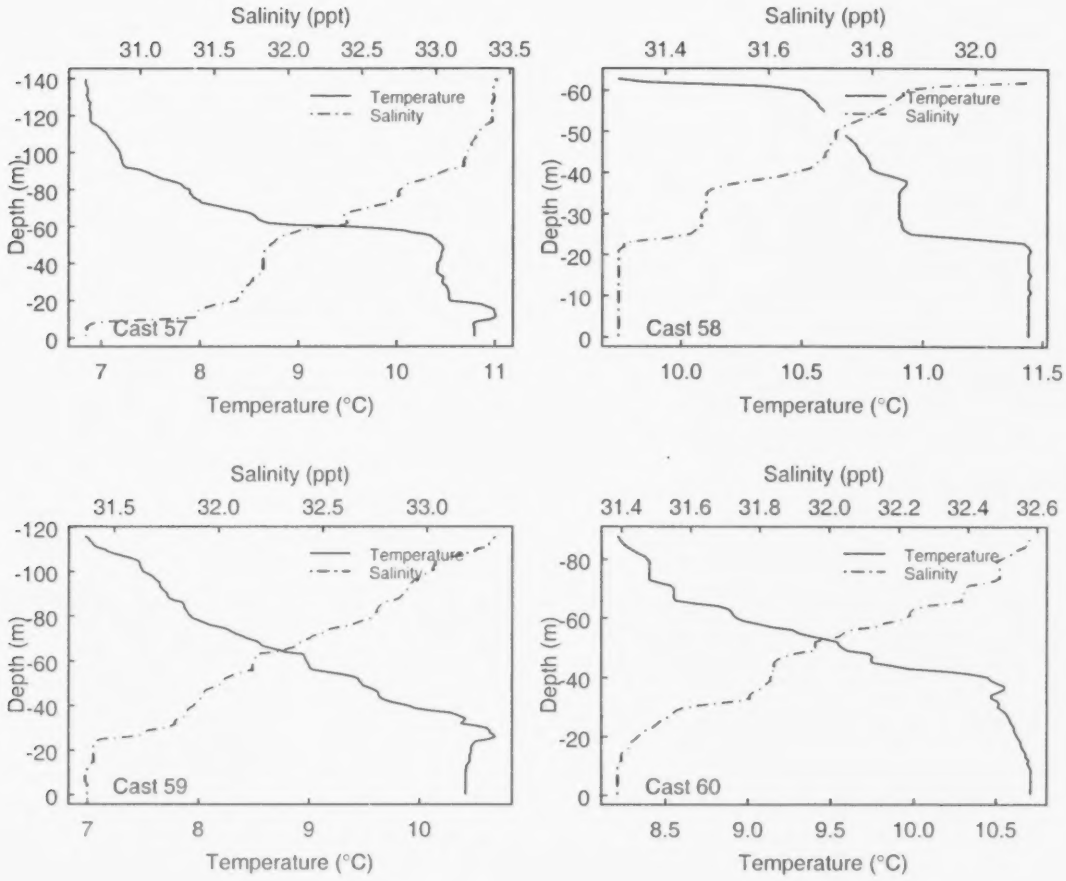

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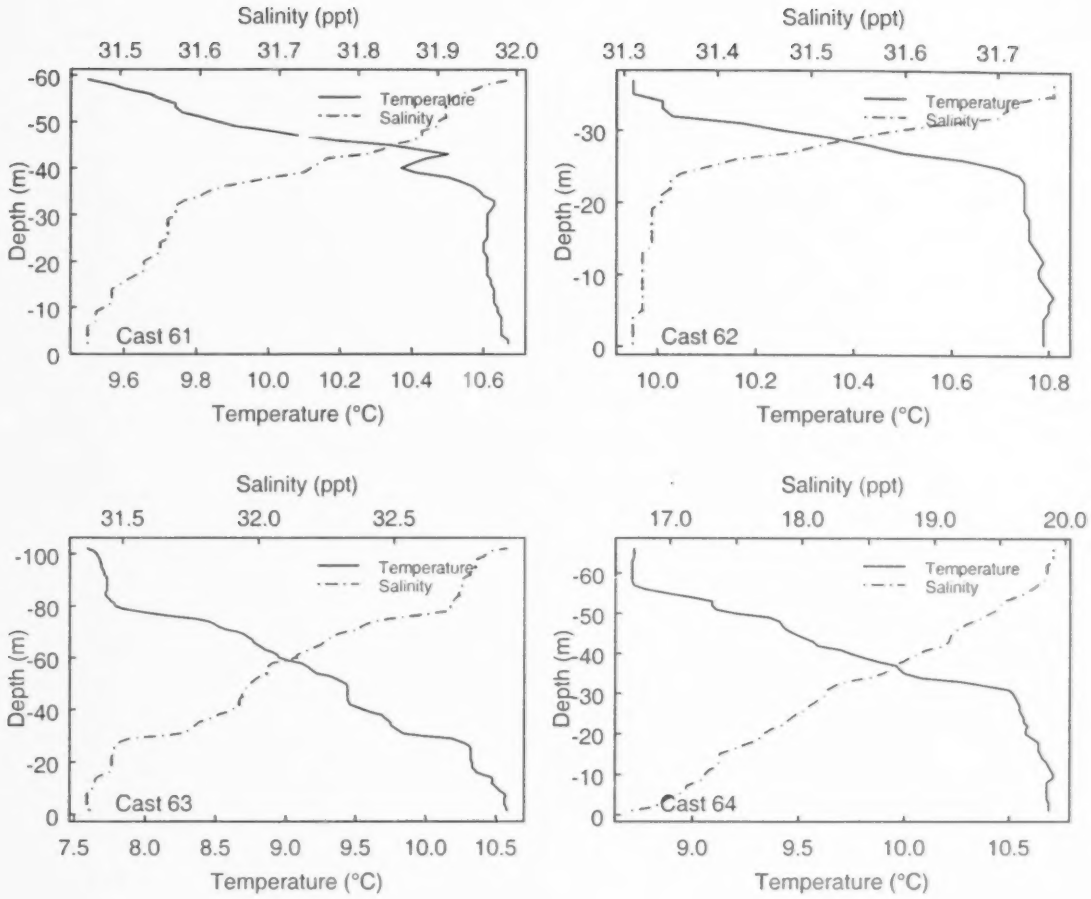

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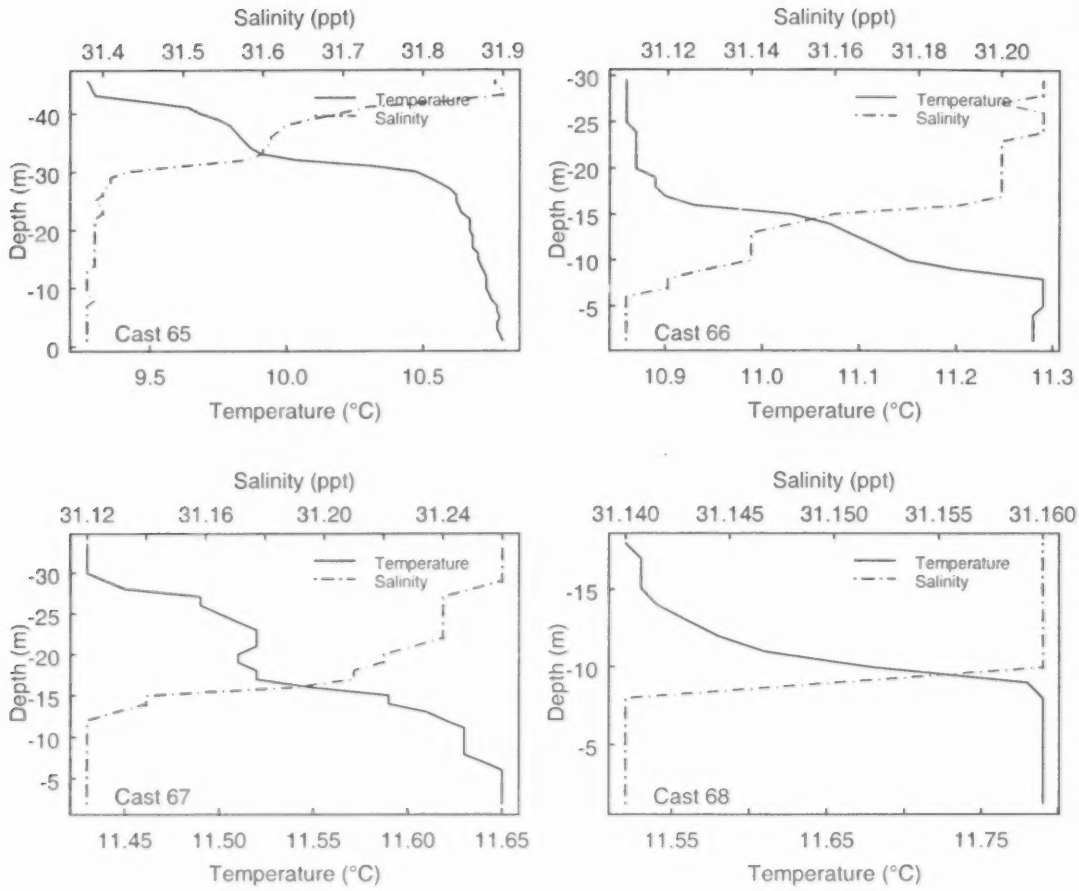

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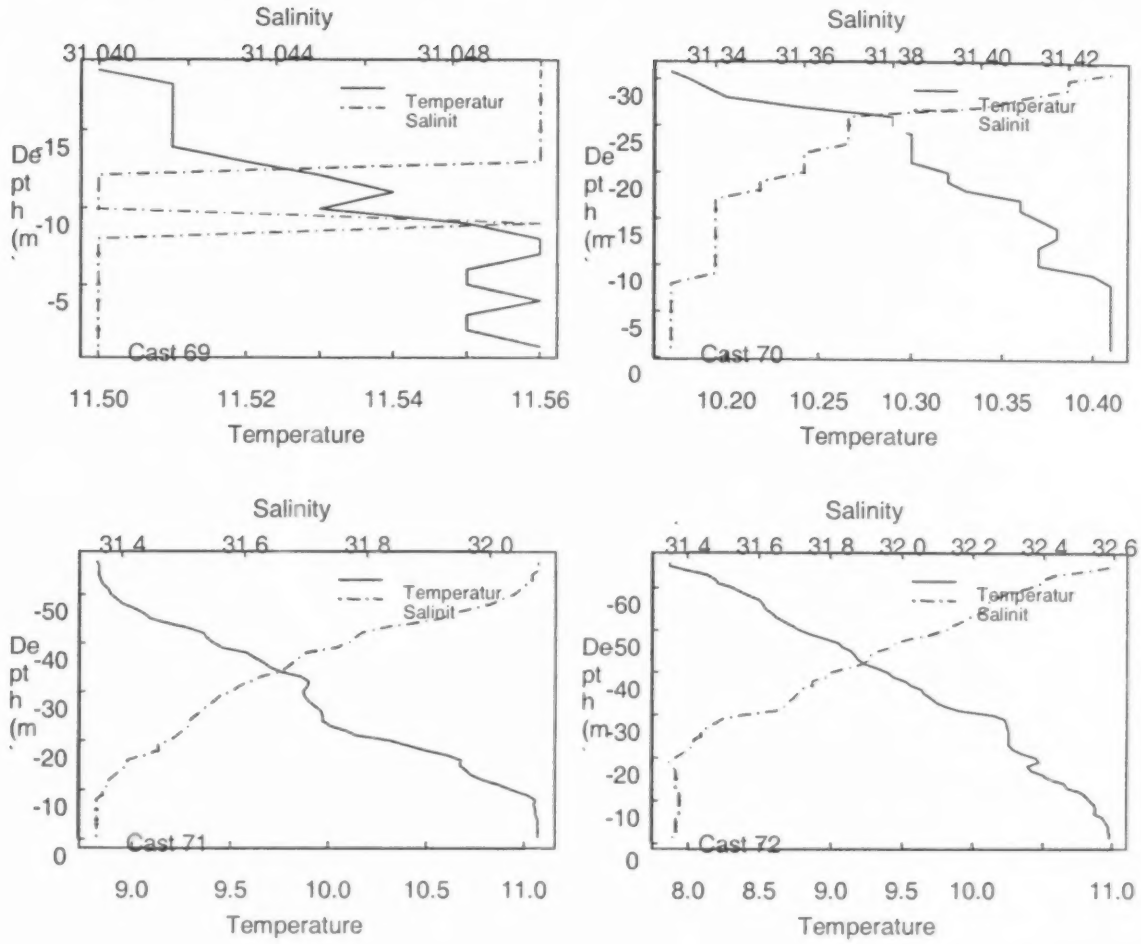

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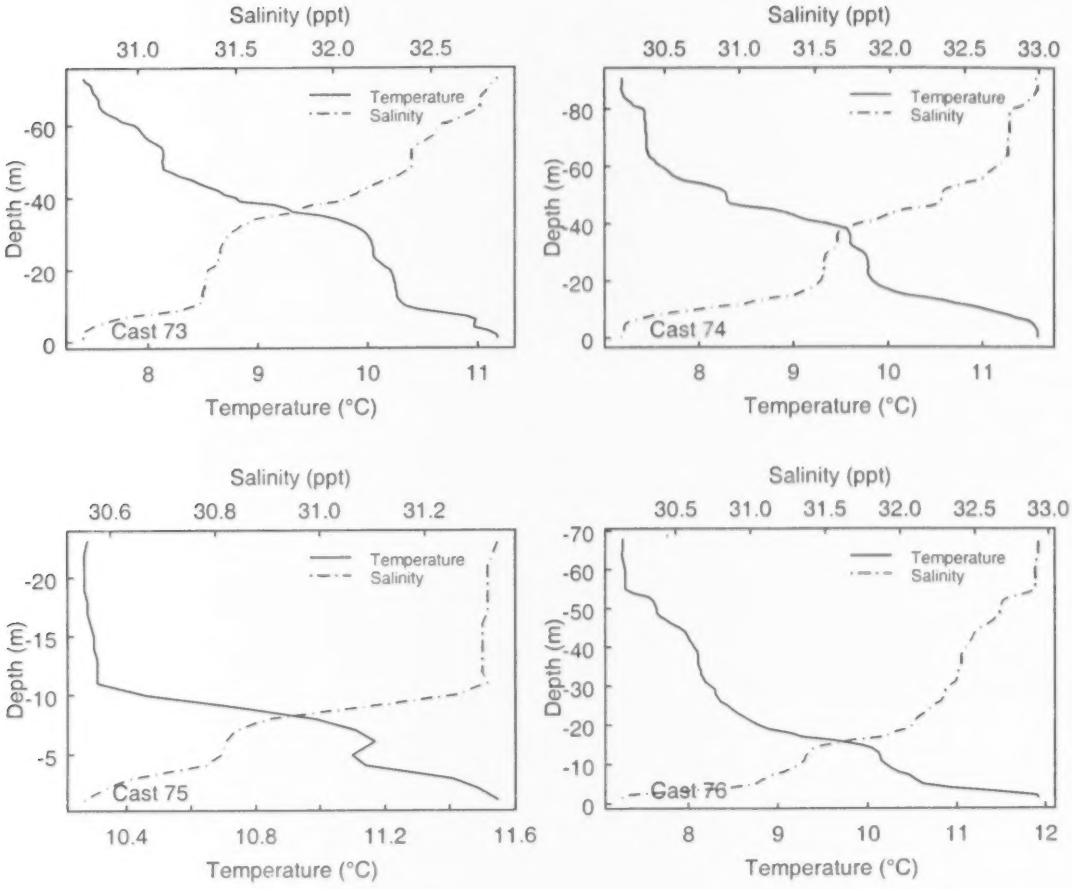

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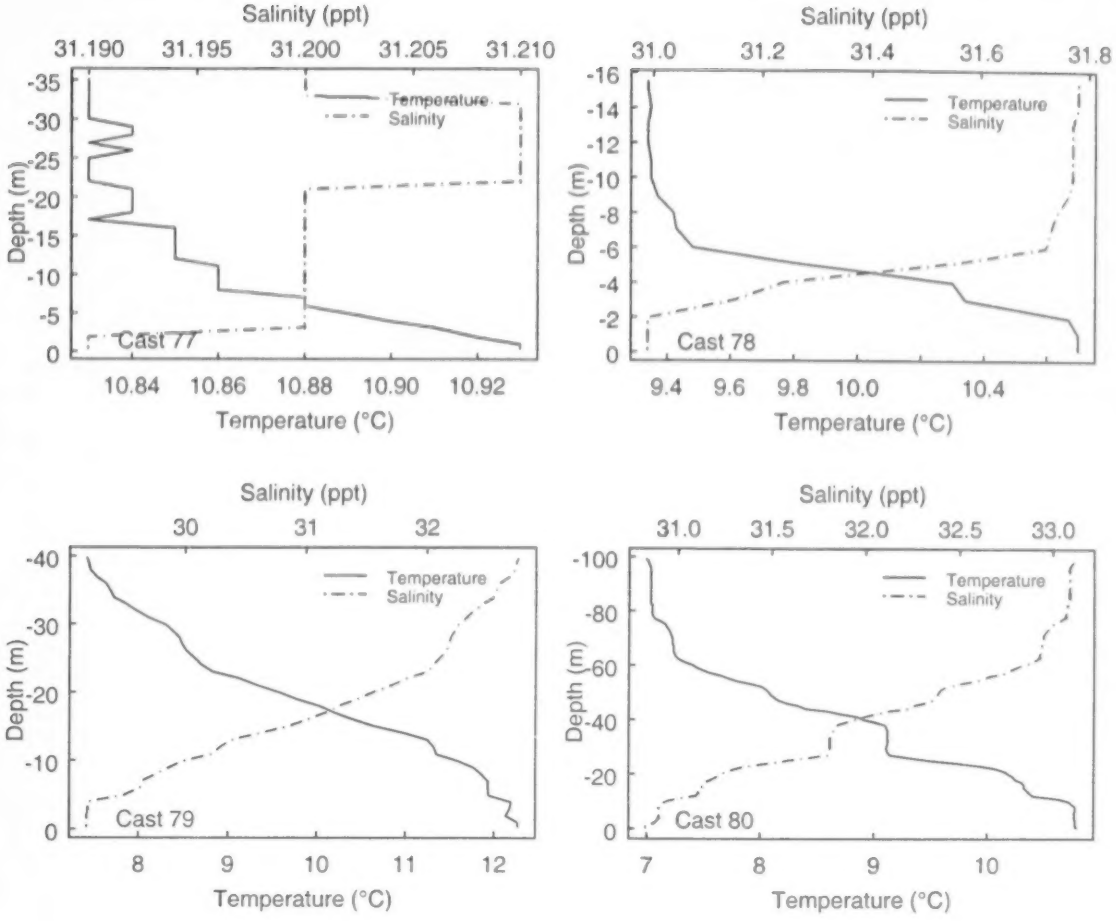

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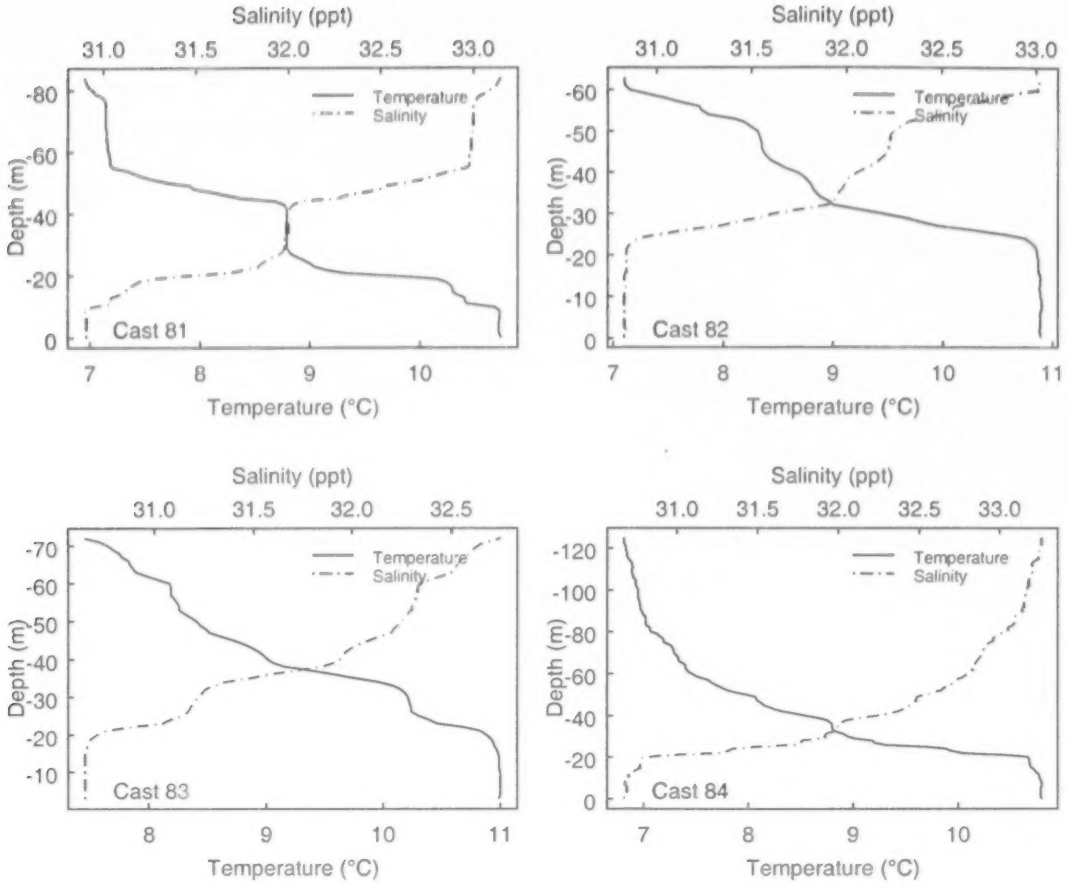

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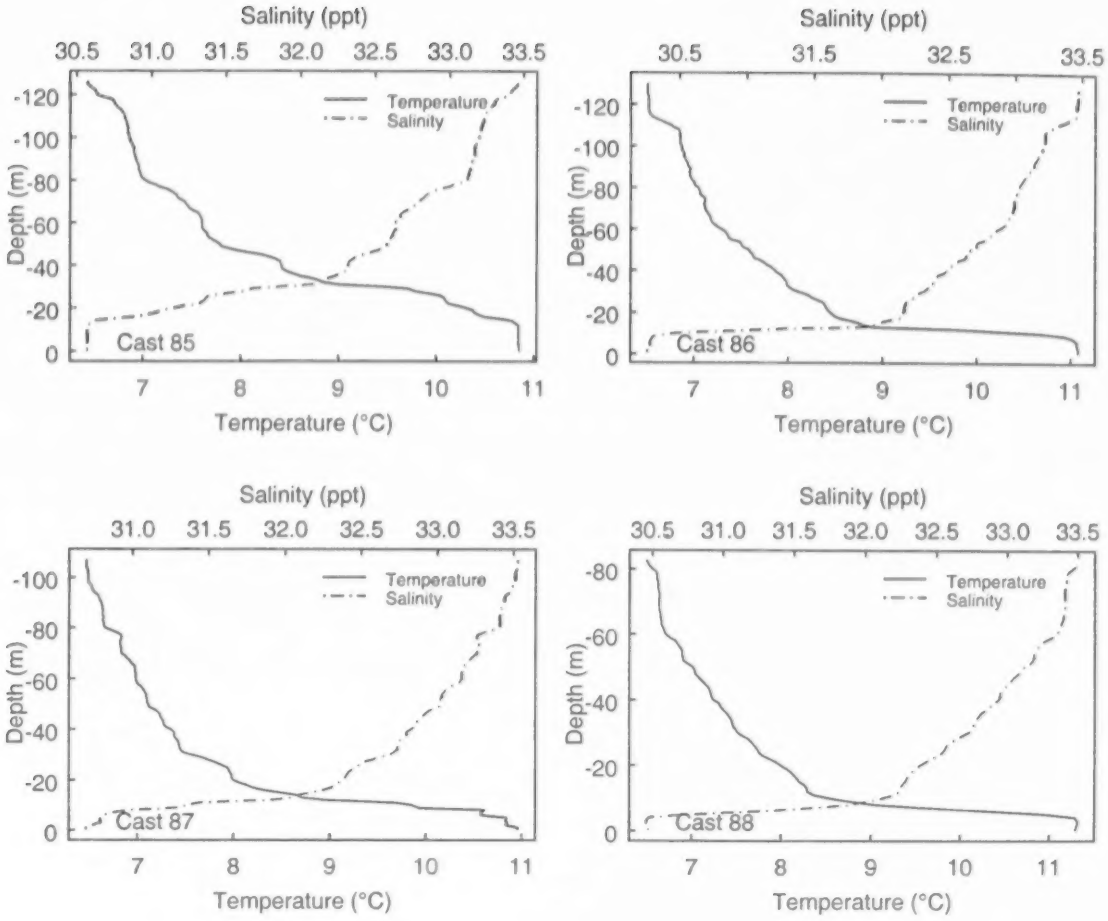

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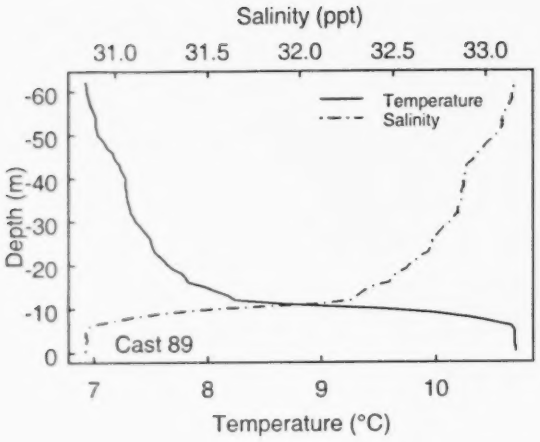

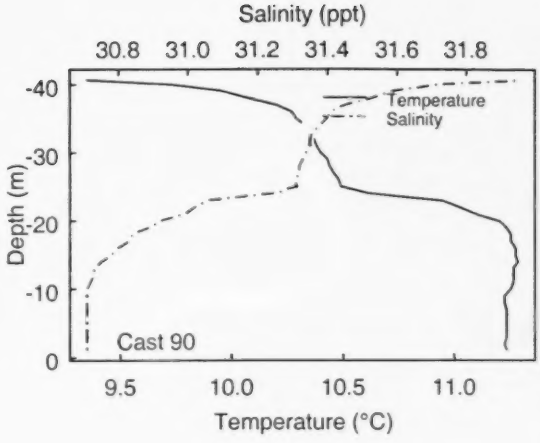

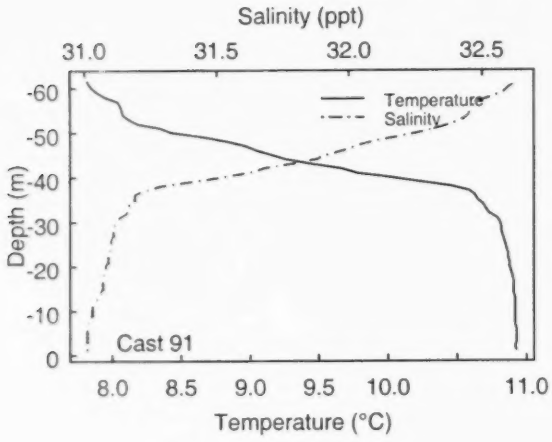

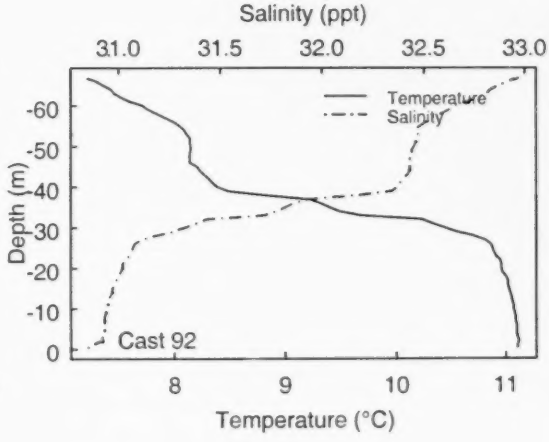

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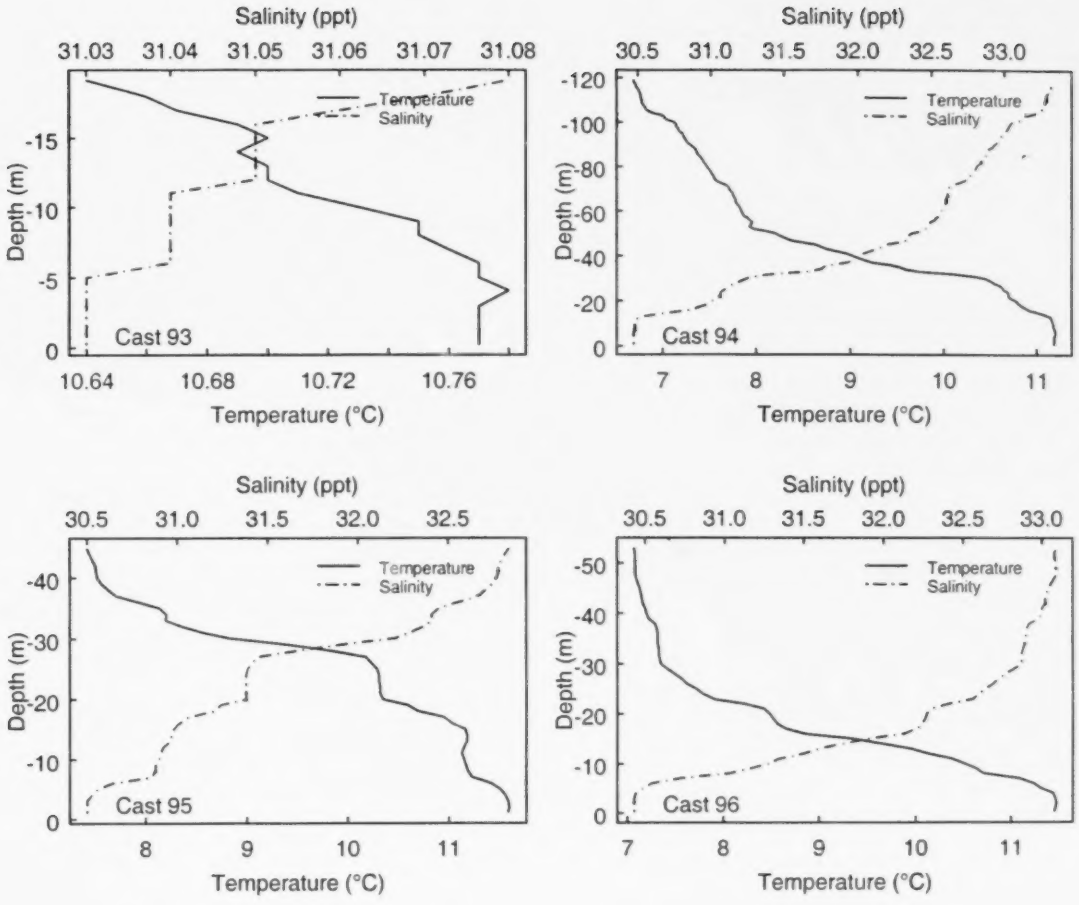

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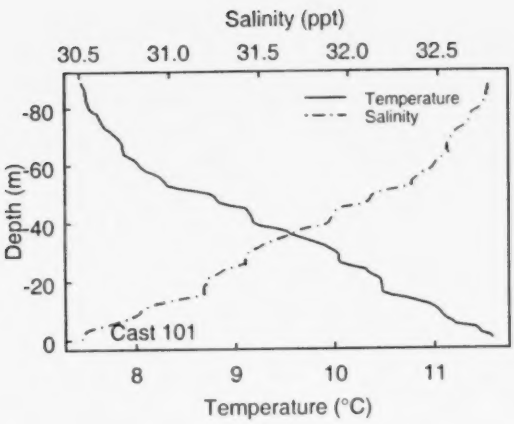

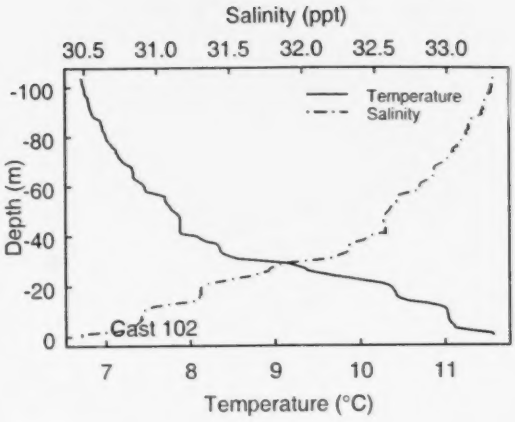

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